

British West Indies Central Sugar Cane
Breeding Station, Barbados

TWENTIETH ANNUAL REPORT

For The Year Ending September 30th, 1953

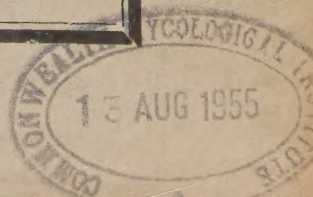


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1. Sugar Cane Breeding — Seedling Selection And Trials

(i) SUGAR CANE BREEDING — B.55' SERIES

The usual methods were employed in the controlled crossing of sugar cane varieties at Groves Agricultural Station from October 1952 to January 1953. The season may be described as average for Barbados, little rainfall being recorded in the early part of 1952 and also in July and August. As a result of this, flowering was relatively poor and irregular, and some difficulty was experienced in obtaining the necessary male arrows to make some of the required crosses. A very wet spell of weather occurred during the first half of November, and crosses made during this time produced very few seedlings. One hundred and ten crosses were obtained for the regular breeding programme, while ten selfs or sib-crosses were made for the Cytogeneticist.

(ii) SEEDLING RAISING, POTTING AND PLANTING IN THE FIELD NURSERY AND SHORT SEASON FIRST YEAR SEEDLING TRIAL — B.54' AND B.55' SERIES

Germination was relatively poor, only about sixty-six thousand seedlings being obtained. Of this number, approximately thirty-nine thousand were potted and just over twenty-seven thousand were planted in the Field Nursery and in the B.54' Series Short Season Trial.

Table I gives, under group heads, a list of the crosses made, the number of seedlings germinated, potted, planted in the Field Nursery and in the B.54' Series Short Season Trial, while Appendix I gives details for all crosses made.

TABLE I

Number of Crosses and Seedlings in each group germinated, potted and planted in the Field Nursery B.55' Series and in the Short Season First Year Seedling Trial B.54' Series

GROUP	No. of Crosses	No. Germ- inated	No. Potted	No. Planted in Field Nursery	No. Planted in Short Season Trial
<i>S. officinarum</i> x <i>S. spontaneum</i>					
3rd Nobilisation Local	1	10	10	8	—
3rd Nobilisation Glagah	1	700	501	300	100
4th Nobilisation Glagah	1	315	315	199	—
Noble x Local x Glagah	5	7,102	3,474	2,028	300
Noble x Local x Glagah x Celebes	1	—	—	—	—
Noble x Glagah x Celebes	4	809	579	429	—
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i>					
Noble x Local x Chunnee	3	442	442	311	—
Noble x Glagah x Chunnee	23	12,688	10,284	6,017	500
Noble x Local x Glagah x Chunnee	50	35,339	18,996	13,101	1,000
Noble x Glagah x Celebes x Chunnee	2	51	51	34	—
Noble x Local x Glagah x Celebes x Chunnee	5	2,552	1,472	1,030	100
<i>S. officinarum</i> x <i>S. barberi</i>					
3rd Nobilisation Chunnee	1	723	723	309	—
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i>					
Noble x Local x Chunnee x Sinense	1	35	35	29	—
Noble x Celebes x Chunnee x Sinense	1	—	—	—	—
Noble x Glagah x Chunnee x Sinense	1	928	464	350	—
Noble x Local x Glagah x Chunnee x Sinense	7	820	622	490	—
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. robustum</i>					
Noble x Glagah x Celebes x Robustum	3	4,838	1,114	688	—
GRAND TOTALS	110	67,352	39,082	25,323	2,000

(iii) PLANTING THE FIRST YEAR SEEDLING TRIAL—B.54' SERIES

This series of seedlings was bred in 1951, potted and planted in the Field Nursery in 1952 and from this into the First Year Seedling Trial in October, 1952. All seedlings which were considered to be too thin for commercial purposes were eliminated at this stage, as well as all seedlings which had flowered, unless these were required for breeding purposes only. This procedure greatly reduces the numbers planted in the First Year Seedling Trial, and saves time and labour during the crop season.

The number of crosses and seedlings in each group planted in the First Year Seedling Trial is given in Table II, while details for each cross are given in Appendix II

TABLE II

Number of Crosses and Seedlings in each group planted in the First Year Seedling Trial, October, 1952, B.54' Series

GROUP	No. of Crosses	No. of Seedlings Planted in First Year Trial
<i>S. officinarum</i> x <i>S. spontaneum</i>		
3rd Nobilisation Glagah	6	373
3rd Nobilisation Celebes	2	130
4th Nobilisation Glagah	3	220
Noble x Local x Glagah	2	340
Noble x Glagah x Celebes	2	82
Noble x Local x Glagah x Celebes	1	150
<i>S. officinarum</i> x <i>S. barberi</i>		
3rd Nobilisation Chunnee	1	70
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i>		
Noble x Glagah x Chunnee	18	1,233
Noble x Local x Chunnee	2	100
Noble x Local x Glagah x Chunnee	40	3,811
Noble x Glagah x Celebes x Chunnee	2	150
Noble x Local x Celebes x Chunnee	1	80
Noble x Local x Glagah x Celebes x Chunnee	4	230
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. robustum</i>		
Noble x Local x Glagah x Celebes x Robustum	1	25
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. robustum</i>		
Noble x Local x Celebes x Chunnee x Robustum	1	40
<i>S. officinarum</i> x <i>S. barberi</i> x <i>S. robustum</i>		
Noble x Chunnee x Robustum	1	40
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. sinense</i>		
Noble x Local x Chunnee x Sinense	1	40
Noble x Local x Glagah x Chunnee x Sinense	—	557
	88	7,671

(iv) RESULTS OF REAPING THE FIRST YEAR SEEDLING TRIAL
B.53' SERIES

This series was bred in 1950 and 1951. The long season seedlings were planted in the Field Nursery in May, 1951, and from this into the First Year Seedling Trial in October, 1951. The Short Season Seedling Trial was planted from seedlings in pots in May, 1952. These trials were cut as plant canes during the past crop season.

As in previous years, the seedlings were cut, bundled and laid out for inspection. Selection was made initially on appearance and, later, on the usual data obtained from each selected bundle.

Twenty-nine selections were made from the Short Season Trial and three hundred and seventy-five from the Long Season Trial, making a total of four hundred and four altogether.

Tables III and IV give details of the Field and Final Selections made from each cross.

TABLE III

First Year Seedling Trials—B.53' Series Field and Final Selections

CROSS	No. of Seedlings Cut	No. Field Selected	% Field Selection	No. Finally Selected	% Final Selection
Ba.11569 x B.49198	9	—	—	—	—
Ba.11569 x Co.421	30	1	3	1	3
B.3172 x B.4098	30	2	7	1	3
B.3353 x B.4098	60	4	7	4	7
B.3365 x B.603	120	9	8	5	4
B.3365 x B.34104	70	6	9	—	—
B.3371 x B.34104	25	2	8	—	—
B.3459 x B.3337	120	13	11	7	6
B.3439 x B.43235	120	5	4	1	1
B.3439 x B.43391	20	1	5	1	5
B.3439 x B.45151	160	21	13	10	6
B.3439 x Co.290	200	21	11	13	7
B.3439 x Co.419	35	—	—	—	—
B.34102 x B.3337	169	20	12	9	5
B.34102 x B.34104	100	3	3	1	1
B.34102 x B.43391	15	4	27	1	7
B.35197 x B.41227	96	4	4	1	1
B.35197 x B.46397	132	13	10	4	3
B.35197 x B.47361	100	1	1	1	1
B.35206 x B.4022	8	4	50	3	40
B.35207 x P.O.J.2878	270	23	9	15	6
B.35247 x B.3337	120	6	5	3	3
B.35247 x Co.419	100	11	11	2	2
B.37161 x B.3337	90	6	7	2	2
B.37161 x B.34104	60	2	3	1	2
B.37161 x B.37175	20	3	15	2	10
B.37161 x B.4098	300	26	9	16	5
B.37161 x B.43391	10	1	10	—	—
B.37161 x B.45151	90	4	4	2	2
B.37161 x P.O.J.2878	30	5	17	5	17
B.37172 x B.34104	20	—	—	—	—
B.37172 x B.4098	150	18	12	9	6
B.37172 x B.42231	40	5	13	2	5
B.37194 x B.4098	20	4	20	2	10
B.47226 x B.47306	20	—	—	—	—
B.38212 x B.4098	160	15	9	9	6
B.38272 x B.3915	5	1	20	1	20
B.39157 x B.4098	145	20	14	9	6
B.39177 x B.4098	20	—	—	—	—
B.39177 x P.O.J.2878	25	1	4	—	—
B.39207 x B.41227	14	—	—	—	—
B.39207 x P.O.J.2878	100	5	5	1	1
B.39254 x B.34104	5	—	—	—	—
B.39254 x B.4098	100	2	2	1	1
B.39254 x B.4534	60	5	8	2	3
B.39254 x P.O.J.2878	5	2	40	1	20
B.4092 x B.3337	100	6	6	2	2
B.4096 x B(30)L.7	70	6	9	2	3
B.4096 x B.35187	20	—	—	—	—
B.40164 x B.41227	100	4	4	3	3
B.4111 x B.4098	100	3	3	—	—
B.4145 x B.34104	80	6	8	1	1

TABLE III (Concluded)

CROSS				No. of Seedlings Cut	No. Field Selected	% Field Selection	No. Finally Selected	% Final Selection
B. 4145	x B. 37193	...	...	270	17	6	7	3
B. 4145	x B. 4098	...	...	400	37	9	13	3
B. 4145	x B. 42231	...	...	15	—	—	—	—
B. 4145	x B. 43337	...	...	8	1	9	—	—
B. 4145	x B. 45151	...	...	60	6	10	2	3
B. 4214	x Co. 419	...	...	5	2	40	—	—
B. 42279	x P. O. J. 2878	...	...	10	1	10	1	10
B. 42304	x B. 38192	...	...	100	2	2	1	1
B. 4362	x B. 37193	...	...	160	16	10	11	7
B. 4362	x B. 39220	...	...	50	5	10	3	6
B. 4362	x B. 4098	...	...	800	72	9	44	6
B. 4362	x B. 40175	...	...	140	8	6	3	2
B. 4362	x B. 41203	...	...	20	1	5	1	5
B. 4362	x B. 41227	...	...	20	—	—	—	—
B. 4362	x B. 4327	...	...	30	2	7	1	3
B. 4362	x B. 43235	...	...	60	10	17	9	15
B. 4362	x B. 43391	...	...	15	1	7	—	—
B. 4362	x B. 46232	...	...	20	2	10	2	10
B. 4362	x Co. 419	...	...	50	10	20	5	10
B. 4362	x P. O. J. 2878	...	...	97	6	6	4	4
B. 43253	x B. 4098	...	...	83	7	8	3	4
B. 43253	x Co. 419	...	...	5	1	20	1	20
B. 43283	x B. 41227	...	...	150	13	9	9	6
B. 43349	x B. 47310	...	...	100	2	2	1	1
B. 43349	x B. 47320	...	...	50	4	8	4	8
B. 43349	x P. O. J. 2878	...	...	5	1	20	1	20
B. 43358	x B. 41227	...	...	40	1	3	—	—
B. 43358	x P. O. J. 2878	...	...	100	6	6	4	4
B. 4502	x B. 45151	...	...	145	9	6	6	4
B. 4550	x B. 603	...	...	6	1	17	1	17
B. 4596	x P. O. J. 2878	...	...	100	2	2	2	2
B. 45107	x B. 603	...	...	13	—	—	—	—
B. 45117	x P. O. J. 2878	...	...	40	4	10	3	8
B. 45137	x B. 41227	...	...	100	—	—	—	—
B. 45154	x B. 37193	...	...	100	7	7	1	1
B. 45154	x B. 41211	...	...	120	9	8	3	3
B. 45170	x B. 41227	...	...	160	15	9	8	5
B. 45170	x Co. 419	...	...	60	1	2	—	—
B. 45198	x B. 391	...	...	60	2	3	—	—
B. 45285	x B. 37193	...	...	100	M	1	X E	D
B. 4699	x B. 4098	...	...	100	2	2	—	—
B. 4726	x B. 4098	...	...	100	2	2	1	1
B. 47183	x P. O. J. 2878	...	...	30	1	3	1	3
B. 47329	x B. 4682	...	...	30	1	3	—	—
B. 48118	x P. O. J. 2878	...	...	100	3	3	—	—
B. 48361	x B. 34104	...	...	35	3	9	1	3
B. 49247	x B. 41227	...	...	60	2	3	—	—
Co. 421	x B. 4098	...	...	30	7	24	7	24
Co. 421	x B. 41211	...	...	750	74	10	29	4
Co. 421	x B. 43375	...	...	200	26	13	16	8
Co. 421	x B. 45116	...	...	100	9	9	3	3
Co. 421	x B. 47147	...	...	230	12	5	2	1
Co. 421	x B. 47419	...	...	100	7	7	5	5

TABLE IV

First Year Seedling Trial—B.53' Series Short Season Field and Final Selections

CROSS				No. of Seedlings Planted	No. Field Selected	% Field Selection	No. Final Selection	% Final Selection
B. 3353	x B. 4098	...	...	100	7	7	2	2
B. 3365	x B. 34104	...	...	100	4	4	1	1
B. 3439	x B. 3337	...	...	100	2	2	—	—
B. 3439	x B. 4098	...	...	100	5	5	—	—
B. 3439	x Co. 290	...	...	100	7	7	4	4
B. 34102	x B. 3337	...	...	100	5	5	1	1
B. 35207	x P. O. J. 2878	...	...	100	6	6	2	—
B. 37161	x B. 3337	...	...	100	4	4	—	—
B. 37172	x B. 4098	...	...	100	3	3	1	1
B. 4145	x B. 34104	...	...	100	4	4	—	—
B. 4145	x B. 4098	...	...	200	15	8	4	2
B. 4145	x B. 37193	...	...	100	5	5	1	1
B. 4362	x B. 4098	...	...	100	6	6	4	4
B. 43283	x B. 41227	...	...	100	4	4	2	2
B. 44341	x B. 3337	...	...	100	5	5	1	1
B. 45170	x B. 41227	...	...	100	—	—	—	—
Co. 421	x B. 41211	...	...	200	7	4	5	3
Co. 421	x B. 46223	...	...	100	3	3	1	1

As a result of these trials, it has been decided not to repeat any of the following crosses, as the percentage number of seedlings selected from their progenies is not sufficiently high :—

B. 3365 x B. 34104	B. 39177 x P. O. J. 2878	B. 45137 x B. 41227
B. 3371 x B. 34104	B. 39207 x B. 41227	B. 45154 x B. 37193
B. 3439 x B. 43235	B. 39207 x P. O. J. 2878	B. 45170 x Co. 419
B. 3439 x Co. 419	B. 4096 x B. 35187	B. 45198 x B. 43391
B. 35197 x B. 46397	B. 4111 x B. 4098	B. 4699 x B. 4098
B. 35197 x B. 47361	B. 4145 x B. 34104	B. 4726 x B. 4098
B. 35247 x B. 3337	B. 4145 x B. 42231	B. 47329 x B. 4682
B. 35247 x Co. 419	B. 42304 x B. 38192	B. 48118 x P. O. J. 2878
B. 37172 x B. 34104	B. 4362 x B. 40175	B. 49247 x B. 41227
B. 37226 x B. 47306	B. 43349 x B. 47310	Co. 421 x B. 47147
B. 39177 x B. 4098	B. 43358 x B. 41227	

(v) PROGRESS WITH SEEDLINGS OF THE B.52' SERIES

The three hundred and ninety-six selections were multiplied at Codrington during 1952, and in October a minor selection reduced the number to two hundred and fifty-two. These seedlings were planted in the Central Sugar Cane Breeding Station's Second Year Seedling Trials at the low rainfall station, Codrington (2 trials) and in duplicate trials at the high rainfall stations, Clifton Hall and Fisherpond.

A Short Season Second Year Seedling Trial with selected seedlings of this series was planted at Codrington in June 1953. Planting material for this trial was established at Codrington in September, 1952. This trial will be irrigated as and when necessary, and will be cut in May, 1954.

Six hundred seedlings of this series were kept as ratoons, and these were cut and re-selected during the past crop. The results are given in Table V.

TABLE V

First Year Seedling Trial. B.52' Series—Ratoons

CROSS	No. Selected in Plant Cane Crop	No. Selected in Ratoon Crop	No. Selected in Plants & Ratoons	New Selections as Ratoons	No. Selected as Plant Cane but not Selected as Ratoons
B.3365 x B.34104	7	5	3	2	2
B.3439 x Co.290	6	8	6	2	—
B.35207 x B.34104	1	1	1	—	—
B.37161 x B.4098	7	5	4	1	2
B.37161 x B.40102	3	5	3	2	—
B.4362 x B.4098	11	13	8	5	3
B.43283 x B.41227	4	1	1	—	3
TOTALS	39	38	26	12	10

It will be seen that the numbers selected from both plants and ratoons were approximately the same. Approximately 66% were selected as plants and ratoons, while 31% were new selections from the ratoon crop, and approximately 25% of those which gained selection as plant canes failed to do so as ratoons. A more detailed study of the figures for the ratoon selections reveals that only one (1) of these appears to have been outstanding, and this may well have been due to the fact that two (2) adjoining stools had died, thus giving it more room for development.

It will be necessary to carry out further selection as ratoons and accumulate more data before any definite conclusions can be arrived at.

(vi) PROGRESS WITH SEEDLINGS OF THE B.51' SERIES

These seedlings were cut as plant canes during the past crop, in the Central Sugar Cane Breeding Station's Second Year Seedling Trials at the low rainfall station, Codrington (2 trials) and in duplicate trials at the high rainfall stations, Todds and Hothersal. Unfortunately, the trial at Todds was burnt, but the trial was reaped and planting material of the selections was obtained from the stumps of the duplicate trial at Codrington.

Thirty-three seedlings were selected, two of which are for the breeding plots at Groves only, while in October, the remainder will be sent to those Colonies for which they were selected.

None of the seedlings in the Short Season Trial proved to be better than the standard varieties under the conditions of the trial.

The performances of the selected seedlings together with those of the standard varieties are given in Tables VI and VII.

TABLE VI

*Second Year Seedling Trials—Plant Canes**Codrington: Cut — 2nd—5th February, 1953**Hothersal: Cut—13th, 16th and 17th March, 1953**B.51' Series*

SEEDLING	PARENTAGE	No. of Canes (Rotten)		% Arrowing		Z.H.R. Brix		Tons Cane per Acre	
		Cod- ring- ton	Hoth- ersal	Cod- ring- ton	Hoth- ersal	Cod- ring- ton	Hoth- ersal	Cod- ring- ton	Hoth- ersal
GROUP I									
B. 37161 ...	Standard ...	72(0)	108(3)	—	6	20.5	20.7	19.10	41.88
B. 4744 ...	Standard ...	139(2)	194(6)	—	1	21.4	20.7	34.18	61.40
B. 5121 ...	Co. 421 x B. 34104	126(5)	169(8)	—	13	20.8	21.2	34.57	55.64
B. 5124 ...	Co. 421 x B. 4098	135(3)	153(9)	—	16	21.4	22.3	38.06	61.49
B. 5126 ...	Co. 421 x B. 41211	144(3)	201(2)	12	55	20.6	21.9	29.09	47.39
GROUP II									
B. 37161 ...	Standard ...	83(1)	144(5)	—	—	19.8	19.5	29.18	53.66
B. 4744 ...	Standard ...	145(2)	169(8)	—	—	21.7	19.4	37.44	58.05
B. 5142 ...	B. 3439 x B. 42231	116(0)	163(4)	—	21	20.7	21.4	30.91	47.73
B. 5143 ...	„ x „ ...	82(3)	165(3)	—	—	19.0	19.5	30.62	60.97
B. 5149 ...	B. 3439 x Co. 419	131(2)	155(3)	1	—	20.2	21.0	32.64	52.12
GROUP III									
B. 37161 ...	Standard ...	73(4)	119(12)	1	8	19.8	20.3	20.16	53.75
B. 4744 ...	Standard ...	127(0)	152(12)	—	1	21.6	20.4	37.63	54.44
B. 5178 ...	B. 37161 x Co. 419 ...	126(4)	149(6)	1	9	19.1	20.3	33.89	52.37
B. 5179 ...	B. 37161 x P.O.J. 2878	92(7)	117(7)	—	—	21.3	21.7	28.51	47.73
GROUP IV									
B. 37161 ...	Standard ...	102(1)	190(10)	—	4	20.1	19.8	30.62	55.56
B. 4744 ...	Standard ...	144(1)	200(12)	—	—	21.6	20.8	38.30	55.64
B. 5192 ...	B. 4111 x B. 4098 ...	129(1)	149(8)	—	2	21.2	21.4	29.28	50.57
B. 51105 ...	B. 42304 x B. 37193	111(1)	200(11)	12	—	21.9	21.0	24.96	55.99
GROUP V									
B. 37161 ...	Standard ...	96(2)	175(4)	—	—	20.4	20.0	32.45	54.09
B. 4744 ...	Standard ...	146(4)	167(2)	—	—	21.6	20.1	39.94	53.41
B. 51116 ...	B. 4362 x B. 34104	110(5)	266(4)	—	—	21.6	21.4	25.25	70.69
B. 51122 ...	B. 4362 x B. 41211	101(5)	167(1)	2	16	21.7	21.0	21.89	40.76
B. 51129 ...	B. 45170 x B. 41227	110(2)	193(12)	—	—	21.6	21.3	30.05	58.22
B. 51131 ...	„ x „ ...	109(3)	259(8)	—	—	21.7	21.5	27.26	66.05
B. 51134 ...	Co. 421 x B. 37193	124(3)	219(4)	—	1	21.2	21.7	33.31	56.42
GROUP VI									
B. 37161 ...	Standard ...	93(0)	166(12)	—	4	20.7	21.4	33.79	55.73
B. 4744 ...	Standard ...	159(4)	152(15)	—	10	21.7	20.7	52.42	69.83
B. 51148 ...	B. 3439 x B. 35269 ...	105(1)	185(4)	—	—	18.2	18.7	35.23	77.23
B. 51152 ...	B. 3439 x B. 37261 ...	110(5)	155(8)	—	—	23.0	23.9	30.91	44.38
B. 51156 ...	B. 3439 x B. 38192 ...	152(1)	201(13)	—	—	20.9	20.9	42.34	71.81
B. 51167 ...	B. 3439 x Co. 290 ...	132(0)	151(9)	—	12	21.2	21.2	38.21	60.63
B. 51168 ...	„ x „ ...	123(1)	150(11)	1	—	20.4	21.3	40.90	61.92

TABLE VII

Second Year Seedling Trials—Plant Canes
Codrington: Cut — 9th—12th February, 1953
Todds: Cut — 10th—12th March, 1953
B.51' Series

SEEDLING	PARENTAGE	No. of Canes (Rotten)		% Arrowing		Z.H.R. Brix		Tons Cane per Acre	
		Cod- ring- ton	Todds	Cod- ring- ton	Todds	Cod- ring- ton	Todds	Cod- ring- ton	Todds
GROUP VII									
B.37161 ...	Standard ...	119(3)	152(10)	—	23	21.5	19.3	33.31	52.80
B.4744 ...	Standard ...	142(3)	153(4)	—	12	23.0	20.7	37.25	50.65
B.51183 ...	B.35197 x B.3337 ...	132(2)	195(8)	—	4	21.4	20.4	32.26	63.38
B.51190 ...	B.35207 x P.O.J.2878	118(4)	178(11)	—	15	22.0	20.1	24.48	59.08
B.51192 ...	„ x „ ...	96(1)	169(8)	—	7	22.2	20.7	23.71	55.81
GROUP VIII									
B.37161 ...	Standard ...	92(7)	177(17)	—	10	21.3	19.6	26.02	59.00
B.4744 ...	Standard ...	135(6)	189(10)	—	9	21.8	20.6	36.19	62.69
B.51211 ...	B.37161 x B.34104	108(6)	191(9)	—	24	21.7	20.0	25.63	59.00
GROUP IX									
B.37161 ...	Standard ...	101(4)	187(18)	—	13	20.8	19.6	21.50	57.45
B.4744 ...	Standard ...	130(5)	153(13)	—	17	21.4	21.0	36.29	69.66
B.51259 ...	B.40272 x Co.290 ...	97(6)	183(9)	21	60	22.0	20.2	32.62	63.55
GROUP X									
B.37161 ...	Standard ...	104(2)	169(11)	—	4	21.2	19.4	32.35	57.62
B.4744 ...	Standard ...	108(1)	150(13)	—	8	20.6	20.8	35.04	61.15
B.51311 ...	B.4145 x B.42231 ...	127(4)	140(11)	—	6	21.6	20.8	35.81	54.35
GROUP XI									
B.37161 ...	Standard ...	110(6)	166(14)	—	15	20.8	19.1	33.50	64.84
B.4744 ...	Standard ...	151(6)	153(17)	—	14	22.1	21.3	45.60	59.43
B.51321 ...	B.4145 x B.42231 ...	106(4)	148(14)	—	8	21.1	20.4	35.71	57.88
GROUP XII									
B.37161 ...	Standard ...	98(8)	159(17)	—	16	21.4	18.9	26.02	65.70
B.4744 ...	Standard ...	107(7)	146(21)	—	8	22.1	20.7	29.57	59.17
B.51341 ...	B.41341 x B.3337 ...	115(1)	157(10)	—	2	21.9	21.0	33.50	51.51
B.51353 ...	Co.421 x B.41211	133(5)	169(14)	—	6	20.7	19.3	40.13	67.42
B.51355 ...	„ x „ ...	118(5)	168(5)	—	1	20.5	18.8	31.97	68.03
B.51360 ...	„ x „ ...	134(5)	150(12)	—	20	20.4	19.6	35.71	55.73
B.51367 ...	„ x „ ...	105(6)	114(15)	—	28	21.8	20.8	28.03	47.73
GROUP XIII									
B.37161 ...	Standard ...	85(6)	193(8)	—	9	21.3	18.2	26.78	61.15
B.4744 ...	Standard ...	116(6)	174(21)	—	14	21.7	20.5	33.98	57.62
B.51374 ...	Co.421 x B.41211 ...	131(6)	175(11)	6	66	21.1	19.1	35.33	54.87

(vii) PROGRESS WITH SEEDLINGS OF THE B.50' SERIES

These seedlings were cut as plant canes during the 1952 crop in the Central Sugar Cane Breeding Station's Second Year Seedling Trials. They were cut as first ratoons at the high rainfall stations, Pool and Andrews during the past crop. As a result of these trials, it has been possible to discard two of the seedlings on their ratoon performance.

The performances of the selected seedlings together with those of the standard varieties are given in Tables VIII and IX.

TABLE VIII

*Second Year Seedling Trials—First Ratoons—B.50' Series**Pool: Cut — 20th—22nd April, 1953*

SEEDLING	PARENTAGE	No. of Canes (Rotten)	% Arrowing	Z.H.R. Brix	Tons Cane per Acre
GROUP I					
B.37161 ...	Standard ...	126(16)	13	21.8	40.76
B.41211 ...	Standard ...	67(37)*	1	21.7	24.25
B.5011 ...	B.3439 x Co.290 ...	147(12)	22	22.8	45.92
B.5012 ...	B.35207 x P.O.J.2878	115(12)	40	22.0	36.38
B.5014 ...	B.37172 x B.34104	138(29)*	3	24.0	33.97
B.5028 ...	B.4145 x B.4098 ...	120(22)	3	23.3	40.76
B.5032 ...	B.45170 x B.41227	151(24)	20	22.8	46.87
GROUP II					
B.37161 ...	Standard ...	106(11)	15	21.8	34.92
B.41211 ...	Standard ...	127(46)*	—	21.8	35.69
B.5037 ...	Co.421 x B.4098 ...	216(10)	2	23.2	55.47
B.5041 ...	Co.421 x B.41211 ...	201(12)	2	21.6	46.87
B.5047 ...	B.3365 x B.34104 ...	234(18)	13	22.6	47.22
B.5060 ...	B.3439 x B.45116 ...	151(37)	—	22.1	34.06
GROUP III					
B.37161 ...	Standard ...	138(8)	20	22.9	46.01
B.41211 ...	Standard ...	132(30)*	1	23.5	44.89
B.5073 ...	B.34102 x B.34104	185(8)	21	23.2	46.18
B.5080 ...	B.35197 x B.4098 ...	86(55)*	7	22.3	33.28
B.5082 ...	B.35197 x B.41227	154(3)	21	23.8	43.60
GROUP IV					
B.37161 ...	Standard ...	145(8)	11	23.1	43.00
B.41211 ...	Standard ...	109(4)	—	23.3	40.34
B.5093 ...	B.35247 x B.41227	194(10)	12	19.8	50.31
B.5098 ...	B.37161 x B.4098 ...	114(11)	—	21.3	41.71
B.50109 ...	" x " ...	101(16)	—	22.7	29.07
B.50112 ...	" x " ...	210(9)	13	22.8	59.34
B.50115 ...	" x " ...	122(9)	—	20.8	47.04
GROUP V					
B.37161 ...	Standard ...	174(13)	17	23.0	46.61
B.41211 ...	Standard ...	132(36)*	—	22.9	46.10
B.50126 ...	B.37194 x B.4098 ...	185(11)	7	24.8	45.07
B.50135 ...	B.38212 x B.4098 ...	145(8)	4	22.5	51.17
B.50141 ...	B.38233 x B.4098 ...	215(25)	8	22.6	53.32
B.50146 ...	B.39254 x B.4098 ...	114(76)	6	23.3	36.29
B.50152 ...	B.4362 x B.4098 ...	153(10)	4	21.0	48.59
B.50153 ...	" x " ...	116(22)	—	23.3	36.20
GROUP VI					
B.37161 ...	Standard ...	117(9)	12	22.6	40.51
B.41211 ...	Standard ...	88(27)*	—	22.6	28.12
B.50155 ...	B.4362 x B.4098 ...	139(13)	4	22.6	40.68
B.50166 ...	B.45102 x B.H.10(12)	150(9)	3	22.3	50.91
B.50184 ...	B.45186 x B.4098 ...	114(16)	7	21.6	39.73

**Some varieties, particularly B.41211 suffered severe rat damage.*

TABLE IX

*Second Year Seedling Trials—First Ratoons—B.50' Series**Andrews: Cut—23rd, 24th and 27th April, 1953*

SEEDLING	PARENTAGE	No. of Canes (Rotten)	% Arrowing	Z.H.R. Brix	Tons Cane per Acre
GROUP VII					
B.37161 ...	Standard ...	162(26)	21	21.6	51.26
B.41211 ...	Standard ...	91(79)*	—	21.1	31.82
B.50196 ...	Co.421 x B.43290 ...	200(27)*	20	21.5	50.14
B.50206 ...	Co.421 x B.43375 ...	168(8)	33	22.3	42.31
B.50210 ...	Co.421 x B.45109 ...	166(14)	11	20.9	55.82
GROUP IX					
B.37161 ...	Standard ...	132(22)	14	20.6	39.48
B.41211 ...	Standard ...	70(101)*	—	22.0	24.51
B.50267 ...	B.37161 x B.4098 ...	165(13)	12	23.1	50.40
B.50268 ...	„ x „ ...	168(32)	—	19.2	43.17
B.50275 ...	„ x „ ...	142(20)	8	22.1	42.91
GROUP X					
B.37161 ...	Standard ...	120(19)	19	21.3	38.79
B.41211 ...	Standard ...	59(44)*	2	22.7	22.53
B.50311 ...	B.37161 x B.4098 ...	179(17)	18	22.6	48.16
GROUP XI					
B.37161 ...	Standard ...	140(47)	11	19.5	40.68
B.41211 ...	Standard ...	95(95)*	—	20.1	25.63
B.50340 ...	B.40272 x Co.281 ...	157(41)*	30	21.2	45.24
B.50345 ...	B.4362 x B.4098 ...	143(30)*	1	20.7	39.56
B.50347 ...	„ x „ ...	177(14)	15	20.5	53.32
B.50352 ...	B.45170 x B.4098 ...	168(15)	33	20.6	48.59
GROUP XII					
B.37161 ...	Standard ...	112(13)	18	21.6	39.13
B.41211 ...	Standard ...	56(28)*	—	21.4	22.45
B.50370 ...	Co.421 x B.43290 ...	201(20)*	23	22.3	46.70
B.50377 ...	Co.421 x B.43375 ...	191(19)	62	24.6	57.19
B.50378 ...	„ x „ ...	141(7)	46	22.6	49.36

*Some varieties, particularly B.41211, were severely damaged by rats.

The selected seedlings of this series were planted in Third Year Seedling Trials in November, 1952. These will be cut during the 1954 crop season.

(viii) PROGRESS WITH SEEDLINGS OF THE B.49' AND EARLIER SERIES

THIRD YEAR AND SELECT SEEDLING TRIALS

A. The Seedlings Tested

1. Third Year Seedling Trials

Plant Canes:— B.4506, B.4942, B.4956, B.4966, B.49122, B.49186, B.49198, B.49229, B.49257, B.49301, B.49309, B.49311, B.49346, B.49353, B.49355 and B.49376.

First Ratoons:— B.4851, B.4881, B.4888, B.48117, B.48126, B.48177, B.48179, B.48259, B.48330, B.48332 and B.48392.

Second Ratoons:— B.4466, B.46103, B.4738, B.4743, B.4744, B.4747, B.4781, B.4788, B.47135, B.47147, B.47151, B.47162, B.47204, B.47214, B.47216, B.47217, B.47233, B.47258, B.47314, B.47379, B.47380, B.47397 and B.47419.

Third Ratoons:— B.4502, B.4503, B.4504, B.4506, B.4556, B.4572, B.4596, B.45137, B.45151, B.45152, B.4604, B.4681, B.4691, B.46102, B.46136, B.46223, B.46232, B.46284, B.46288, B.46395 and S.45.

2. *Select Seedling Trials*

Plant Canes:— B.37161, B.41211, B.45151, B.4744 and B.47419.

First Ratoons:— B.37161, B.4098, B.41211, B.46223 and B.46397.

B. An Ecological Classification of the Trials—Turner's Classification

This classification was proposed by Turner after a study of the sugar cane soils of the British West Indian Colonies and is as follows:—

Group I:— Soils with a natural tilth and free natural drainage which require neither to be ploughed nor drained.

Group II:— Soils with a tilth which can be improved by ploughing, but which do not require to be drained.

(a) LOW RAINFALL AREAS

Third Year Seedling Trials

Plant Canes	...	...	...	...	Bushy Park
First Ratoons	...	...	...	...	Bromefield

Select Seedling Trials

Plant Canes	...	...	...	...	Crab Hill
First Ratoons	...	...	...	...	Coverley

(b) INTERMEDIATE RAINFALL AREAS

Third Year Seedling Trials

Plant Canes	...	...	...	...	Pickerings and Belle
First Ratoons	...	...	...	...	Foursquare and Staple Grove
Second Ratoons	...	...	...	...	Wotton and Oughterson

Select Seedling Trials

Plant Canes	...	...	...	...	Searles and Hampton
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(c) HIGH RAINFALL AREAS

Third Year Seedling Trials

Plant Canes	...	...	...	...	Mount Wilton and Portland
First Ratoons	...	...	...	...	Applewhaites and Cottage
Second Ratoons	...	...	...	...	Portland and Easy Hall
Third Ratoons	...	...	...	...	Kendal

Select Seedling Trials

Plant Canes	...	...	...	...	Applewhaites and Bowmanston
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Group III:— Soils which require to be drained but are preferably left unploughed.

Group IV:— Soils with a poor natural tilth in which a tilth can be created by ploughing, but which require to be drained to maintain their tilth.

(b) INTERMEDIATE RAINFALL AREAS

Third Year Seedling Trials

Plant Canes	...	...	...	...	Carrington
First Ratoons	...	...	...	...	Belle
Second Ratoons	...	...	...	...	Carrington

Select Seedling Trials

Plant Canes	...	...	...	...	Bulkeley
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C. Rainfall During the Seasons

TABLE X

MONTH					1930—31 to 1949—50	1950—51	1951—52	1952—53
January	...	...	...	...	3.06	6.06	3.45	0.65
February	...	...	...	...	1.51	1.95	14.35	0.58
March	...	...	...	...	1.51	2.86	2.28	2.64
April	...	...	...	...	2.01	1.17	7.50	2.84
May	...	...	...	...	2.76	6.56	2.07	3.04
June	...	...	...	...	4.66	10.99	7.39	5.38
July	...	...	...	...	6.78	3.37	6.03	5.67
August	...	...	...	...	6.75	10.01	12.89	3.47
September	...	...	...	...	7.58	7.24	10.86	7.21
October	...	...	...	...	7.80	13.52	4.37	9.07
November	...	...	...	...	8.77	11.26	10.80	7.48
December	...	...	...	...	4.41	4.68	8.65	3.54
January	...	...	...	...	3.23	3.45	0.65	3.35
February	...	...	...	...	1.54	14.35	0.58	2.11
March	...	...	...	...	1.63	2.28	2.64	2.04
TOTALS	...	...	...	...	64.00	99.75	94.51	59.07

The early part of the year 1952 was very dry, and another very dry spell was experienced in July and August. However, good and well distributed rainfall was received for the remaining part of the year, and the early part of 1953, and a sugar crop of just over 161,000 tons was made. Juices were good, although tonnages were not outstanding.

TABLE XI

Soil Type:—Group II(a) Third Year Seedling Trials—Plant Canes

Bushy Park — Cut—4th and 5th March, 1953

VARIETY	Tons Cane per Acre	Z.H.R. Brix	% Sucrose in Juice	Purity	No. of Rotten Canes per Plot
B.37161 ...	33.39	21.5	19.1	90.7	11
B.41211 ...	41.33	20.6	16.4	79.4	22
B.4744 ...	48.73	21.9	16.8	80.5	24
B.47419 ...	27.22	21.8	18.9	87.9	61
B.4906 ...	38.12	24.1	18.7	82.0	12
B.4942 ...	36.55	22.5	20.3	89.0	18
B.4956 ...	34.96	18.9	17.1	86.6	36
B.4966 ...	38.77	21.7	18.4	82.1	23
B.49122 ...	25.84	20.1	16.7	88.3	99
B.49186 ...	31.85	21.2	17.2	81.0	21
B.49198 ...	36.40	21.3	17.3	82.3	12
B.49229 ...	26.96	23.5	21.2	89.4	27
B.49257 ...	46.51	19.7	15.3	83.0	45
B.49301 ...	30.38	20.9	16.6	80.8	18
B.49309 ...	31.03	21.9	19.7	88.7	19
B.49311 ...	31.73	23.4	20.9	90.0	14
B.49346 ...	34.61	19.6	14.9	77.5	42
B.49353 ...	27.34	21.9	19.6	89.2	19
B.49355 ...	32.24	21.9	18.1	84.9	21
B.4098 ...	38.05	21.8	19.6	88.1	12

A difference of ± 5.31 tons of cane per acre may be considered significant.

In this trial, B.4744 gave the heaviest yield of plant cane and was significantly better than all others except B.49257, which in turn was significantly better than all others with the exception of B.41211.

The juice quality of certain varieties in this trial was very poor indeed, and does not present a true picture. Samples were taken from Blocks I and VI in this trial and the variation in the sucrose content of certain varieties between these blocks was alarming. These results were noted in the laboratory and the analyses were checked. Varieties which gave poor juices were next marked on a plan of the trial and it was found that these all fell roughly on the two rows of plots nearest the road in Block I. The Manager of Bushy Park Plantation was approached on this subject and said that filter press mud had been dumped along the eastern side of the field along the road. Heavy rains had fallen before this mud could be spread properly, and he had to spread it out roughly and in very large quantities along the eastern edge of the field. This probably accounts for the wide variations which amounted to as much as 5% sucrose in juice. Under the circumstances no useful purpose can be served in discussing the juice qualities of the varieties in this trial.

TABLE XII
Soil Type:—Group II(a) Third Year Seedling Trials—First Ratoons
Bromefield — Cut—25th and 26th March, 1953

VARIETY	TONS CANE PER ACRE			Z. H. R. Brix			% SUCROSE IN JUICE			PURITY			No. of ROTTEN CANES PER PLOT		
	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean
B. 37161 ...	34.94	29.74	32.34	21.8	22.4	22.1	18.5	19.8	19.2	—	89.8	89.8	9	10	10
B. 4098 ...	35.91	33.86	34.89	23.1	22.8	23.0	18.9	20.4	19.7	—	88.9	88.9	8	12	10
B. 41211 ...	36.05	31.79	33.92	21.5	21.7	21.6	19.2	19.4	19.3	—	88.9	88.9	59	11	35
B. 41227 ...	34.46	36.33	35.40	22.5	23.6	23.1	19.4	20.3	19.9	—	88.9	88.9	6	11	9
B. 4851 ...	30.30	21.24	25.77	21.4	20.2	20.8	18.4	18.1	18.3	—	86.3	86.3	4	9	7
B. 4881 ...	33.41	30.29	31.85	21.1	20.8	21.0	17.2	17.6	17.4	—	85.9	85.9	6	8	7
B. 4888 ...	30.60	31.75	31.18	21.1	20.8	21.0	17.8	18.6	18.2	—	86.9	86.9	10	5	8
B. 48117 ...	30.37	20.43	25.40	21.8	22.2	22.0	17.7	18.5	18.1	—	85.1	85.1	7	11	9
B. 48126 ...	28.46	24.24	26.12	21.7	21.6	21.7	19.1	19.3	19.2	—	91.0	91.0	22	12	17
B. 48177 ...	33.07	30.42	31.75	21.4	22.6	22.0	18.5	19.5	19.0	—	88.0	88.0	38	14	26
B. 48179 ...	33.56	35.41	34.49	21.3	20.2	20.8	18.9	18.2	18.6	—	86.3	86.3	11	11	11
B. 48259 ...	24.20	21.12	22.66	22.0	21.2	21.6	19.2	19.3	19.3	—	90.2	90.2	49	16	23
B. 48330 ...	25.58	25.88	25.73	21.7	22.7	22.2	18.9	20.3	19.6	—	90.3	90.3	62	27	45
B. 48332 ...	28.22	25.10	26.66	21.5	21.4	21.5	18.0	18.4	18.2	—	86.5	86.5	8	5	7
B. 48392 ...	50.66	35.30	42.98	20.7	21.1	20.9	18.0	18.1	18.1	—	85.0	85.0	5	3	4

A difference of ± 4.95 tons cane per acre may be considered significant.

In this trial, B.41227 gave the heaviest yield of ratoon cane, but was not significantly better than B.48179, B.48392, B.4098, B.41211 and B.4888. B.48179 and B.48392 gave good yields of cane, but had relatively poor juices. B.41227 and B.4098 did very well under the conditions of this trial, and both have very good juices.

Taking the results of the two crops, B.48392 has given the heaviest yield of cane, but its juice quality has been so poor that it cannot be considered for commercial planting. None of the other varieties of the B.48' Series was as good as B.41227 and B.4098.

TABLE XIII

Soil Type:—Group II(a) Select Seedling Trials—Plant Canes

Crab Hill—Cut 24th February, 1953

VARIETY	Tons Cane per Acre	Tons Sugar per Acre	% Sucrose in Cane	Purity	No. of Rotten Canes per Plot
B.37161 ...	36.22	5.78	16.0	90.4	14
B.41211 ...	39.17	6.25	16.0	87.6	17
B.4744 ...	35.82	5.82	16.3	88.3	11
B.47419 ...	33.18	5.46	16.5	88.7	29

Differences between mean yields of cane and sugar in this trial were insignificant.

In this trial, B.41211 gave the heaviest yield of plant cane followed by B.37161, B.4744 and B.47419. B.41211 gave the heaviest yield of sugar followed by B.4744, B.37161 and B.47419. However, the variation in yield from plot to plot was so great that the differences between mean yields cannot be shown to be significant.

TABLE XIV
Soil Type:—Group II(a) Select Seedling Trials—First Ratoons
Coverley — Cut—28th March, 1953

VARIETY	TONS CANE PER ACRE			TONS SUGAR PER ACRE			% SUCROSE IN CANE			QUOTIENT OF PURITY			No. of ROTTEN CANES PER PLOT		
	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean
B.37161 ...	28.66	30.38	29.52	4.02	4.98	4.50	14.0	16.4	15.2	90.6	92.1	91.4	4	11	7
B.4098 ...	28.57	30.62	29.60	4.16	5.34	4.75	14.5	17.4	15.5	89.3	90.3	89.8	4	8	6
B.41211 ...	40.71	34.58	37.65	5.56	5.75	5.66	13.7	16.6	15.2	87.2	88.8	88.0	1	8	4
B.46223 ...	40.38	37.51	38.95	5.87	6.18	6.03	14.5	16.5	15.5	88.2	88.2	88.2	4	10	7
B.46397 ...	41.12	37.03	39.08	5.93	6.11	6.02	14.4	16.5	15.5	88.1	89.0	88.6	1	8	4

A difference of ± 3.19 tons cane per acre and 0.49 tons sugar per acre between mean yields may be considered significant.

In this trial, B.46223 gave the heaviest yield of ratoon cane followed by B.46397 and B.41211. All of these were significantly better than B.37161 and B.4098. B.46223 gave the heaviest yield of ratoon sugar followed by B.46397. Both of these varieties significantly outyielded B.37161 and B.4098 on sugar. B.41211 just failed to outyield B.4098 significantly on sugar, but was better than B.41211 under the conditions of this trial.

Taking the mean yields over two crops, B.46397 has given the heaviest yield of cane followed by B.46223, B.41211, B.4098 and B.37161. However, B.46223 has given slightly more sugar than B.46397.

The three varieties, B.41211, B.46223 and B.46397 are indistinguishable morphologically and have been found to possess the same chromosome numbers. Accordingly, B.46223 and B.46397 will be discarded.

TABLE XV

Soil Type:—Group II(b) Third Year Seedling Trials—Plant Canes

Pickerings — Cut—23rd and 24th March, 1953

VARIETY	Tons Cane per Acre	Z.H.R. Brix	% Sucrose in Juice	Purity	No. of Rotten Canes per Plot
B.37161 ...	43.08	22.5	19.2	88.9	16
B.41211 ...	41.89	21.9	17.3	80.8	29
B.4744 ...	51.17	22.7	18.4	84.2	24
B.47419 ...	40.21	22.4	19.9	87.8	20
B.4906 ...	41.39	23.6	18.8	79.4	11
B.4942 ...	46.54	22.7	20.1	86.4	40
B.4956 ...	33.44	21.3	18.1	86.3	62
B.4966 ...	43.90	21.9	16.9	78.1	35
B.49122 ...	34.65	21.4	18.0	85.2	25
B.49186 ...	35.40	22.5	19.6	86.1	45
B.49198 ...	47.22	20.7	14.1	70.8	17
B.49229 ...	37.90	23.6	21.8	90.6	21
B.49257 ...	36.72	19.1	14.5	73.9	72
B.49301 ...	37.20	22.1	16.7	77.1	14
B.49309 ...	33.14	22.6	21.2	90.2	15
B.49311 ...	44.70	23.2	22.2	91.6	22
B.49346 ...	43.39	20.3	14.6	69.5	45
B.49353 ...	39.30	23.3	19.3	87.3	19
B.49355 ...	34.46	22.9	17.1	77.3	15
B.49376 ...	48.17	20.9	17.8	83.7	29

A difference between mean yields of ± 6.39 tons cane per acre may be considered significant.

In this trial, B.4744 gave the heaviest yield of plant cane and was significantly better than all others except B.49376, B.49198 and B.4942. However, none of the latter proved to be significantly better than B.37161. B.49311 gave a reasonably good yield and cane of excellent quality, and may have been better if it did not flower so profusely. None of the varieties of the B.49' Series proved to be better than the standard B.4744.

TABLE XVI

*Soil Type:—Group II(b) Third Year Seedling Trials—Plant Canes**Belle — Cut—24th and 25th February, 1953*

VARIETY	Tons Cane per Acre	Z.H.R. Brix	% Sucrose in Juice	Purity	No. of Rotten Canes per Plot
B.37161 ...	41.52	20.2	17.4	86.2	15
B.41211 ...	44.54	21.4	17.7	83.5	7
B.4744 ...	47.92	21.5	18.0	85.8	14
B.47419 ...	41.22	20.6	17.9	85.5	29
B.4906 ...	36.36	23.9	20.0	83.8	6
B.4942 ...	40.75	22.0	19.8	86.7	20
B.4956 ...	37.64	19.3	15.7	83.2	23
B.4966 ...	39.58	20.9	18.1	82.1	8
B.49122 ...	38.88	20.3	17.5	86.5	13
B.49186 ...	36.95	20.9	17.7	83.4	9
B.49198 ...	41.49	20.0	16.7	80.3	7
B.49229 ...	32.34	21.8	20.8	89.0	13
B.49257 ...	47.50	18.6	14.5	80.9	19
B.49301 ...	36.58	21.2	17.5	83.4	10
B.49309 ...	38.32	21.1	18.9	86.3	16
B.49311 ...	38.45	22.1	19.8	87.4	16
B.49346 ...	42.25	20.0	16.0	78.5	14
B.49353 ...	35.68	21.3	17.8	86.1	24
B.49355 ...	32.73	19.8	15.1	79.3	14
B.4098 ...	39.94	21.7	17.1	83.5	9

A difference of ± 6.14 tons cane per acre between mean yields may be considered significant.

In this trial, B.4744 again gave the heaviest yield of plant cane, but was not significantly better than B.49257, B.41211 and B.49346. The only one of the B.49' Series which appeared to show promise in this trial was B.49257, and its juice quality was so poor that it cannot be considered for planting on a commercial scale.

B.49229 had the best juice quality followed by B.4906, B.4942 and B.49311.

TABLE XVII
Third Year Seedling Trials—First Ratoons
Foursquare — Cut—13th and 16th February, 1953

VARIETY	TONS CANE PER ACRE			Z. H. R. BRIX			% SUCROSE IN JUICE			PURITY			No. of ROTTEN CANES PER PLOT		
	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean
B. 37161 ...	33.18	38.55	35.87	21.3	21.4	21.4	18.9	18.1	18.5	*	90.0	90.0	5	4	5
B. 4098 ...	34.81	28.27	31.54	22.6	22.0	22.3	18.6	18.7	18.7	—	86.8	86.8	2	3	3
B. 41211 ...	41.66	34.68	38.17	21.2	19.7	20.5	18.7	17.0	17.9	—	86.4	86.4	6	5	6
B. 41227 ...	37.66	39.64	38.65	21.3	21.4	21.4	19.3	18.8	19.1	—	87.7	87.6	1	3	2
B. 4851 ...	34.20	28.66	31.43	21.1	19.6	20.4	18.5	17.3	17.9	—	86.9	86.9	5	1	3
B. 4881 ...	27.20	26.43	26.82	20.8	19.5	20.2	17.1	15.9	16.5	—	85.1	85.1	5	5	5
B. 4888 ...	27.49	31.79	29.64	20.7	19.3	20.0	17.4	16.0	16.7	—	84.8	84.8	5	2	4
B. 48117 ...	29.13	23.22	26.18	20.9	19.7	20.3	17.4	17.0	17.2	—	84.6	84.6	2	6	4
B. 48126 ...	29.58	25.48	27.53	21.3	20.5	20.9	17.7	17.5	17.6	—	89.7	89.7	4	7	6
B. 48177 ...	34.91	36.48	35.70	22.1	20.9	21.5	18.8	18.2	18.5	—	87.4	87.4	9	4	7
B. 48179 ...	31.30	39.42	35.36	20.3	19.6	20.0	17.5	16.4	17.0	—	84.7	84.7	4	4	4
B. 48259 ...	32.73	24.61	28.67	20.9	19.7	20.3	18.4	17.0	17.7	—	88.8	88.8	3	2	3
B. 48330 ...	35.68	26.67	31.18	22.3	21.3	21.8	19.8	18.7	19.3	—	88.8	88.8	6	6	6
B. 48332 ...	27.79	26.14	27.47	20.9	20.6	20.8	17.7	17.6	17.7	—	86.3	86.3	2	3	3
B. 48392 ...	46.92	35.63	41.28	21.4	20.1	20.8	18.0	17.4	17.7	—	86.0	86.0	3	4	4

*Purity figures were not obtained for the Plant Cane crop.

A difference of ± 3.50 tons cane per acre between mean yields may be considered significant.

In this trial, B.41227 gave the heaviest yield of ratoon cane closely followed by B.48179 and B.37161. The juice quality of B.48179 was poor, and none of the other varieties of the B.48' Series came near the standard varieties, B.41227 and B.37161.

Taking the yields over the two crops, B.48392 has given the heaviest yield of cane followed by B.41227, B.41211 and B.37161. However, the juice quality of B.48392 is so poor that it cannot be considered for commercial planting.

TABLE XIX
 Third Year Seedling Trials—First Ratons
 Staple Grove — Cut—30th and 31st March, 1953

VARIETY	TONS CANE PER ACRE			Z. H. R. BREX			% SUCROSE IN JUICE			PURITY			No. of ROTTEN CANES PER PLOT	
	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns. Mean
B. 37161 ...	42.64	42.96	42.80	20.4	21.9	21.2	17.7	19.6	18.7	*	91.6	91.6	5	8 7
B. 4098 ...	45.87	48.73	47.30	21.7	21.9	21.8	18.3	20.0	19.2	—	88.3	88.3	6	9 8
B. 41211 ...	45.20	46.14	45.67	20.3	21.1	20.7	15.6	19.4	17.5	—	88.7	88.7	5	14 10
B. 41227 ...	50.64	48.40	49.52	20.0	22.4	21.2	17.0	20.5	18.8	—	90.4	90.4	12	13 13
B. 4851 ...	45.66	42.26	44.46	19.9	20.5	20.2	18.1	18.5	18.3	—	88.1	88.1	3	12 8
B. 4881 ...	42.52	46.37	44.45	19.8	20.5	20.2	15.9	17.0	16.5	—	85.3	85.3	7	7 7
B. 4888 ...	38.42	45.81	42.12	20.4	21.3	20.9	17.6	18.5	18.1	—	89.7	89.7	3	6 5
B. 48117 ...	34.55	37.22	35.89	20.8	21.8	21.3	17.1	18.8	18.0	—	85.1	85.1	5	3 4
B. 48126 ...	41.81	34.75	38.28	21.4	22.3	21.9	18.0	20.7	19.4	—	91.8	91.8	14	6 10
B. 48177 ...	45.38	35.39	40.39	20.0	20.6	20.3	16.6	18.2	17.4	—	88.1	88.1	13	36 25
B. 48179 ...	38.08	43.39	40.74	20.4	20.0	20.2	18.0	17.6	17.8	—	87.5	87.5	7	12 10
B. 48259 ...	39.44	37.90	38.67	18.6	21.1	19.9	15.4	19.4	17.4	—	90.7	90.7	15	15 15
B. 48330 ...	41.63	34.09	37.86	20.6	21.5	21.1	18.5	20.0	19.3	—	91.4	91.4	11	23 17
B. 48332 ...	30.98	37.14	34.06	20.6	22.1	21.4	18.1	20.1	19.1	—	92.6	92.6	3	5 4
B. 48392 ...	59.44	46.85	53.15	19.3	20.4	19.9	15.7	18.1	16.9	—	85.7	85.7	6	8 7

*Purity figures were not obtained for the Plant Cane Crop.

A difference of ± 4.02 tons cane per acre between mean yields may be considered significant.

In this trial, B.4098 gave the heaviest yield of ratoon cane closely followed by B.41227. B.4881, B.48392, B.41211 and B.4888 also gave good yields of ratoon cane, but except in the case of B.41211, the juice quality of these varieties was relatively poor.

Taking the yields over the two crops, B.48392 has given the heaviest yield of ratoon cane, followed by B.41227 and B.4098. The juice quality of B.48392 however precludes this variety from being grown commercially.

TABLE XX

Soil Type:—Group II(b) Third Year Seedling Trials—Second Ratoons
Wotton — Cut—26th and 27th February, 1953

VARIETY	TONS CANE PER ACRE				Z.H.R. BRIX				% SUCROSE IN JUICE				PURITY				NO. OF ROTEN CANES PER PLOT			
	Plant	Ist Rtns.	2nd Rtns.	Mean	Plant	Ist Rtns.	2nd Rtns.	Mean	Plant	Ist Rtns.	2nd Rtns.	Mean	Plant	Ist Rtns.	2nd Rtns.	Mean	Plant	Ist Rtns.	2nd Rtns.	Mean
B.37161 ...	43.54	37.93	31.72	37.73	21.0	21.8	20.7	21.2	17.9	18.0	17.9	17.9	*	*	—	88.7	14	11	8	11
B.4098 ...	40.22	35.90	33.87	36.66	21.9	22.5	22.3	22.2	18.1	19.2	19.9	19.1	—	—	—	88.5	11	15	9	12
B.4121 ...	52.88	37.54	33.76	41.39	20.5	20.6	20.3	20.5	18.1	16.0	17.2	17.1	—	—	—	84.9	8	15	6	10
B.4466 ...	44.88	34.46	30.89	36.74	20.4	20.9	19.6	20.3	17.1	17.1	17.4	17.2	—	—	—	87.2	6	9	10	8
B.46103 ...	39.10	31.03	26.03	32.05	20.9	21.4	20.8	21.0	18.1	18.2	18.2	18.2	—	—	—	86.8	14	9	8	10
B.4738 ...	41.33	48.17	41.76	43.75	21.1	21.4	21.0	21.2	18.1	18.5	18.3	18.3	—	—	—	87.4	7	8	6	7
B.4743 ...	39.96	38.74	33.30	37.33	20.9	21.3	21.4	21.2	16.9	18.0	17.4	17.4	—	—	—	83.5	8	5	8	7
B.4744 ...	53.87	41.97	31.61	42.48	22.1	22.5	21.3	22.0	18.8	17.7	18.7	18.4	—	—	—	86.6	6	16	12	12
B.4747 ...	44.56	46.93	39.14	43.54	20.5	21.7	20.9	21.0	17.3	18.0	18.5	17.9	—	—	—	86.0	24	17	9	17
B.4764 ...	41.09	40.13	34.30	38.51	21.9	21.1	22.0	21.7	18.7	18.6	19.2	18.8	—	—	—	87.4	6	11	11	9
B.4781 ...	42.80	39.35	37.11	39.75	20.4	22.4	20.9	21.2	18.0	18.8	18.5	18.4	—	—	—	87.8	6	7	4	6
B.4788 ...	39.71	37.38	36.83	37.97	21.4	22.2	21.9	21.8	17.8	19.2	18.7	18.6	—	—	—	86.3	6	11	7	8
B.47135 ...	42.40	36.99	32.52	37.30	19.5	21.3	20.0	20.3	15.1	18.5	17.7	17.1	—	—	—	87.4	7	6	4	8
B.47147 ...	43.51	31.73	28.03	34.42	20.7	21.0	20.5	20.7	17.3	17.1	17.5	17.3	—	—	—	86.2	7	14	4	8
B.47151 ...	41.55	32.42	32.40	35.46	20.7	21.8	22.3	21.6	17.8	18.0	18.2	18.0	—	—	—	84.5	26	9	10	14
B.47162 ...	41.12	37.11	34.39	37.57	21.2	22.6	21.6	21.8	17.4	18.8	17.9	18.0	—	—	—	85.0	11	14	8	11
B.47214 ...	41.19	32.47	22.45	32.04	20.2	20.7	20.6	20.5	16.4	16.9	17.4	16.9	—	—	—	87.9	10	11	15	12
B.47216 ...	43.57	33.57	28.11	35.08	20.2	20.9	21.3	20.8	15.8	17.4	17.2	17.0	—	—	—	87.4	9	9	8	9
B.47217 ...	39.79	30.22	24.67	31.56	19.5	20.9	20.0	20.1	15.8	18.7	16.7	17.1	—	—	—	86.7	12	10	17	13
B.47258 ...	43.50	36.17	33.20	37.62	21.9	22.8	22.0	22.2	19.9	19.5	20.0	19.8	—	—	—	88.4	6	10	6	7
B.47314 ...	44.90	39.18	28.54	37.54	21.0	22.3	20.1	21.1	18.7	18.8	17.7	18.4	—	—	—	87.3	3	7	7	6
B.47379 ...	37.73	29.26	28.11	31.70	20.3	21.2	20.8	20.8	15.8	17.6	17.4	16.9	—	—	—	88.3	7	9	10	9
B.47380 ...	43.38	34.56	29.26	35.73	23.2	23.8	23.2	23.4	19.3	20.1	19.8	19.7	—	—	—	87.4	9	13	12	11
B.47397 ...	41.19	30.44	27.23	32.95	20.6	21.2	21.0	20.9	17.6	16.7	17.4	17.2	—	—	—	83.2	19	11	11	14
B.47419 ...	51.32	36.54	35.98	41.28	20.5	21.5	21.1	21.0	18.6	18.2	19.0	18.6	—	—	—	88.2	16	37	8	20

*Purity figures for plant cane and first ratoon crops were not obtained.

A difference of ± 5.48 tons cane per acre between mean yields may be considered significant.

In this trial, B.4738 gave the heaviest yield of ratoon cane, and proved to be greatly and significantly better than the standard varieties. However, it was not significantly better than B.4747, B.4781, B.4788 and B.47419. None of these varieties significantly exceeded the standard varieties under the conditions of this trial. B.4744 gave a reasonably good yield of ratoon cane, as did B.47258. The latter had the best juice of the lot.

Taking the results of the three crops, B.4738 has given the heaviest yield of cane, followed by B.4747, B.4744, B.41211 and B.47419. B.4738 arrowed freely as a plant cane, but appears to ratoon exceptionally well. It has a good juice and may become a commercial cane in the low and intermediate rainfall areas. B.4747 is very thin and difficult to cut and clean, and so cannot be considered for commercial use. B.4744 and B.47419 have already been distributed to the plantations for trial on a commercial scale, but unfortunately no really dry season has been experienced since these varieties have been under trial.

TABLE XXI
Soil Type:—Group II(b) Third Year Seedling Trials—Second Ratoons
Oughterson — Cut—16th and 17th April, 1953

VARIETY	TONS CANE PER ACRE					Z.H.R. BRIX					% SUCROSE IN JUICE					PURITY					No. OF ROTTEN CANES PER PLOT				
	Plant Cans	1st Rtns.	2nd Rtns.	Mean		Plant Cans	1st Rtns.	2nd Rtns.	Mean		Plant Cans	1st Rtns.	2nd Rtns.	Mean		Plant Cans	1st Rtns.	2nd Rtns.	Mean		Plant Cans	1st Rtns.	2nd Rtns.	Mean	
B.37161 ...	41.72	37.48	36.51	38.57		19.7	21.5	22.6	21.3		17.6	18.0	20.5	18.7		*	—	90.9	90.9		11	4	9	8	
B.4098 ...	43.34	40.38	34.82	39.51		21.3	21.5	22.4	21.7		18.0	17.5	20.6	18.7		—	—	89.0	89.0		4	4	9	5	
B.41211 ...	49.62	38.74	25.41	37.92		20.9	20.1	21.6	20.9		18.5	17.0	19.3	18.3		—	—	88.4	88.4		25	11	64	33	
B.4466 ...	49.75	33.39	33.25	38.80		20.0	20.5	21.1	20.5		16.8	17.9	19.2	18.0		—	—	89.7	89.7		10	1	7	6	
B.46103 ...	42.12	30.24	23.21	33.52		19.9	19.9	21.8	20.5		17.1	17.3	19.0	17.8		—	—	88.6	88.6		9	2	9	7	
B.4738 ...	43.60	37.97	40.24	40.60		20.7	20.8	23.0	21.2		17.5	18.1	20.2	18.6		—	—	91.0	91.0		7	8	8	8	
B.4743 ...	45.80	37.04	36.10	39.65		20.4	20.2	21.7	20.8		17.4	16.5	18.7	17.5		—	—	85.6	85.6		15	1	8	8	
B.4744 ...	58.71	38.19	33.25	43.38		21.4	21.4	24.8	22.5		18.2	18.3	21.0	19.2		—	—	89.9	89.9		13	2	4	6	
B.4747 ...	46.71	42.57	40.10	43.13		20.1	19.8	21.9	20.6		16.4	16.6	19.6	17.5		—	—	88.5	88.5		30	19	30	26	
B.4764 ...	44.77	36.05	34.79	38.54		21.3	21.0	23.0	21.8		18.3	18.6	20.6	19.2		—	—	89.9	89.9		11	2	6	6	
B.4781 ...	40.85	32.73	35.83	36.47		20.6	21.4	22.7	21.6		17.9	18.3	20.3	18.8		—	—	89.6	89.6		13	4	7	8	
B.4788 ...	43.80	38.21	34.86	38.96		21.3	21.6	22.7	21.9		18.2	18.1	19.9	18.7		—	—	88.7	88.7		11	3	9	8	
B.47135 ...	48.20	38.20	38.28	41.56		19.4	19.6	22.2	20.4		17.6	17.3	19.9	18.3		—	—	90.6	90.6		6	1	4	4	
B.47147 ...	43.95	33.98	29.91	35.94		20.4	20.0	22.4	20.9		17.3	17.1	20.0	18.1		—	—	90.4	90.4		6	3	9	6	
B.47151 ...	42.68	34.86	36.63	38.06		20.4	20.9	22.4	21.2		17.5	17.2	19.4	18.0		—	—	87.6	87.6		22	8	13	14	
B.47162 ...	39.96	38.39	36.81	38.39		20.4	21.7	22.6	21.6		17.3	19.0	20.9	19.1		—	—	90.5	90.5		11	3	11	8	
B.47214 ...	44.62	31.50	29.74	35.29		19.4	19.0	21.8	20.1		16.2	15.6	19.7	17.2		—	—	90.8	90.8		11	3	12	9	
B.47216 ...	42.50	31.46	26.33	33.43		19.3	19.8	21.5	20.2		15.9	15.3	18.8	16.7		—	—	89.1	89.1		11	1	6	6	
B.47217 ...	46.51	31.72	27.92	35.17		19.7	19.8	21.1	20.2		16.4	16.3	18.8	17.2		—	—	89.4	89.4		9	3	6	6	
B.47258 ...	42.89	39.81	40.32	41.01		21.7	21.6	23.7	22.3		18.3	18.7	21.9	19.6		—	—	91.9	91.9		9	2	9	7	
B.47314 ...	43.45	38.10	35.11	38.89		21.4	22.2	23.7	22.4		18.8	18.9	21.8	19.8		—	—	91.4	91.4		7	2	8	6	
B.47379 ...	46.78	32.02	34.58	37.79		19.8	19.1	22.0	20.3		16.5	15.0	19.9	17.1		—	—	89.5	89.5		7	1	5	4	
B.47380 ...	42.73	34.27	32.26	36.42		22.1	22.5	24.4	23.0		19.3	20.3	22.1	20.6		—	—	91.3	91.3		11	1	14	9	
B.47397 ...	43.89	31.77	30.22	35.29		20.2	19.1	22.5	20.6		17.0	16.1	18.5	17.2		—	—	83.5	83.5		20	3	11	11	
B.47419 ...	53.08	44.35	36.77	44.73		20.2	20.3	22.9	21.1		18.2	17.3	20.1	18.5		—	—	90.1	90.1		14	6	14	11	

* Purity figures for plant cane and first ratoon crops were not obtained.

A difference of ± 4.82 tons cane per acre between mean yields may be considered significant.

In this trial, B.47258 gave the heaviest yield of ratoon cane, closely followed by B.4738 and B.4747. Neither of these varieties, however, were significantly better than B.47135, B.47162, B.47419, B.47151, B.37161, B.4743 and B.4781. B.4744 did not perform so well as a ratoon under the conditions of this trial, but one of its plots was severely damaged by the lorries hauling the canes from previous crops to the factory.

Taking the average yields over the three crops, B.47419 has given the heaviest yield of cane followed by B.4744, B.4747, B.47135, B.47258 and B.4738. B.4747 and B.47135 have field and factory characters which prohibit their commercial cultivation. B.4744 and B.47419 are already under commercial trial, while B.4738 and B.47258 will be tested further under the low and intermediate, and intermediate and high rainfall conditions respectively. The latter has the advantage of possessing an excellent juice.

TABLE XXII

Soil Type:—Group II(b) Select Seedling Trials—Plant Canes

Hampton — Cut—3rd March, 1953

Searles — Cut—6th February, 1953

VARIETY	TONS CANE PER ACRE		TONS SUGAR PER ACRE		% SUCROSE IN CANE		QUOTIENT OF PURITY		NO. OF ROTTEN CANES PER PLOT	
	Hamp- ton	Searles	Hamp- ton	Searles	Hamp- ton	Searles	Hamp- ton	Searles	Hamp- ton	Searles
B.37161 ...	30.46	34.18	4.28	4.79	14.0	14.0	88.3	89.6	37	11
B.41211 ...	27.60	41.68	4.01	5.70	14.5	13.7	85.7	87.0	57	5
B.4744 ...	29.98	44.30	4.28	6.20	14.8	14.1	87.1	89.1	39	8
B.47419 ...	24.24	41.94	3.79	5.68	15.7	13.5	88.3	86.7	63	14

Differences between mean yields in these trials cannot be shown to be significant.

At Hampton, B.37161 gave the heaviest yield of cane followed closely by B.4744, B.41211 and B.47419. At Searles, B.4744 gave the heaviest yield of cane followed by B.47419, B.41211 and B.37161. The differences between the mean yields of these varieties cannot be shown to be significant. At Hampton, B.4744 and B.37161 gave the same sugar yield, while at Searles, B.4744 gave the heaviest yield of sugar followed by B.41211 and B.47419. Here again, the differences between the mean yields of sugar cannot be shown to be significant.

TABLE XXIII

*Soil Type:—Group II(c) Third Year Seedling Trials—Plant Canes**Mount Wilton — Cut—7th and 8th April, 1953*

VARIETY	Tons Cane per Acre	Z.H.R. Brix	% Sucrose in Juice	Purity	No. of Rotten Canes per Plot
B. 37161 ...	48.32	20.8	18.7	90.8	27
B. 41211 ...	30.22	20.6	19.2	89.4	160
B. 4744 ...	63.52	21.0	18.4	89.0	53
B. 47419 ...	46.79	20.7	18.8	89.8	110
B. 4906 ...	46.17	22.6	20.0	87.6	36
B. 4942 ...	46.99	20.9	18.7	88.2	67
B. 4098(A) ...	44.63	20.5	17.8	87.6	51
B. 4966 ...	41.27	21.1	18.8	89.0	42
B. 49122 ...	44.13	20.4	18.1	88.6	48
B. 49186 ...	40.71	21.7	18.9	89.2	26
B. 49198 ...	61.11	19.6	14.5	75.8	22
B. 49229 ...	40.98	21.0	19.5	90.2	63
B. 49257 ...	53.67	19.4	16.0	85.4	61
B. 49301 ...	38.88	20.5	17.6	86.9	53
B. 49309 ...	42.88	21.4	19.7	90.0	40
B. 49311 ...	53.31	21.4	20.4	90.2	37
B. 49346 ...	47.25	20.1	15.4	77.0	44
B. 49353 ...	43.97	21.1	19.2	90.7	39
B. 49355 ...	39.89	20.9	18.5	88.6	70
B. 4098 ...	50.13	21.6	18.6	87.8	50

A difference of ± 9.34 tons cane per acre may be considered significant.

In this trial, B. 4744 gave the heaviest yield of plant cane, followed by B. 49198. B. 4744 was significantly better than all other varieties with the exception of B. 49198. The latter in turn significantly outyielded all others with the exception of B. 49257 and B. 49311.

B. 49311 had the best juice quality, followed by B. 4906, B. 49309, B. 49229, B. 49253 and B. 41211.

B. 41211 and B. 47419 suffered severely from rat and weevil borer damage in this trial, although all varieties suffered some damage from these pests.

TABLE XXIV

*Soil Type:—Group II(c) Third Year Seedling Trials—Plant Canes**Portland — Cut—17th and 18th February, 1953*

VARIETY	Tons Cane per Acre	Z.H.R. Brix	% Sucrose in Juice	Purity	No. of Rotten Canes per Plot
B.37161	48.72	19.6	17.4	89.4	10
B.41211	50.91	18.6	16.2	84.7	18
B.4744	61.84	20.0	18.1	88.9	12
B.47419	49.01	18.5	16.2	85.2	16
B.4906	46.89	23.0	19.3	87.8	10
B.4942	50.29	21.3	19.2	88.6	12
B.4956	53.42	18.2	14.3	84.1	17
B.4966	48.20	20.0	17.0	85.8	12
B.49122	46.17	20.0	15.9	87.1	16
B.49186	43.66	19.5	17.2	87.2	8
B.49198	54.06	19.3	14.6	79.7	6
B.49229	42.36	20.4	19.6	90.4	21
B.49257	67.35	18.0	14.8	82.9	20
B.49301	39.73	19.8	17.4	87.0	13
B.49309	39.60	19.8	17.4	88.5	18
B.49311	52.32	20.5	19.0	90.0	16
B.49346	44.13	18.4	14.5	78.3	13
B.49353	44.18	20.7	17.1	88.5	14
B.49355	48.13	19.8	17.4	87.5	16
B.49376	52.48	19.1	17.3	87.8	14

A difference of ± 6.66 tons cane per acre may be considered significant.

In this trial, B.49257 gave the heaviest yield of plant cane and was significantly better than all others with the exception of B.4744. This in turn was significantly better than any of the other varieties tried.

B.49229 had the best juice quality, and was followed in this respect by B.4906, B.4942 and B.49311. B.4744 had a fair juice of reasonable purity, while the juice of B.49257 was so poor that it cannot be considered for commercial cultivation. This trial was cut relatively early in the season and none of the varieties was really ripe.

TABLE XXV
Soil Type:—Group II(c) Third Year Seeding Trials—First Ratoons
Applewhaites — Cut—19th and 20th March, 1953

VARIETY	TONS CANE PER ACRE			Z.H.R. BRIX			% SUCROSE IN JUICE			PURITY			NO. OF ROTTEN CANES PER PLOT		
	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean
B.37161 ...	37.59	41.18	39.39	20.8	20.8	20.8	18.2	18.5	18.4	*	90.3	90.3	30	9	20
B.4098 ...	42.89	44.23	43.56	21.2	21.2	21.2	18.0	19.6	18.8	—	89.4	89.4	16	12	14
B.41211 ...	39.80	45.98	42.89	21.5	20.5	21.0	16.1	18.5	17.3	—	88.5	88.5	15	13	14
B.41227 ...	46.16	49.92	48.04	20.3	21.5	20.9	17.3	19.2	18.3	—	89.4	89.4	35	11	23
B.4851 ...	43.63	38.23	40.93	21.5	20.3	20.9	17.8	18.3	18.1	—	86.8	86.8	14	24	19
B.4881 ...	42.06	43.92	42.99	20.0	20.2	20.1	16.5	15.8	16.2	—	83.1	83.1	15	5	10
B.4888 ...	34.60	45.23	39.92	21.0	20.9	21.0	18.4	18.3	18.4	—	87.6	87.6	26	6	16
B.48117 ...	37.75	37.90	37.83	21.2	21.3	21.3	18.3	19.0	18.7	—	87.3	87.3	27	8	18
B.48126 ...	40.05	40.44	40.25	20.8	21.2	21.0	17.8	18.2	18.0	—	88.9	88.9	34	13	24
B.48177 ...	33.57	42.64	38.11	20.1	21.3	20.7	16.0	17.1	16.6	—	83.5	83.5	77	24	51
B.48179 ...	32.49	43.30	37.90	21.7	19.9	20.8	18.5	17.1	17.8	—	87.1	87.1	22	12	17
B.48259 ...	31.75	40.86	36.31	20.0	21.1	20.6	15.1	18.8	17.0	—	89.4	89.4	27	17	22
B.48330 ...	36.94	31.25	34.20	22.4	21.2	21.8	20.4	19.3	19.9	—	90.6	90.6	56	46	51
B.48332 ...	39.01	36.63	37.82	21.4	21.6	21.5	17.9	19.2	18.6	—	88.2	88.2	13	8	11
B.48392 ...	59.80	49.21	54.51	19.8	20.5	20.2	14.0	18.2	16.1	—	86.0	86.0	15	12	14

*Purity figures were not obtained for the plant cane crop.

A difference of ± 4.95 tons cane per acre between mean yields may be considered significant.

In this trial, B.41227 gave the heaviest yield of ratoon cane closely followed by B.48392.

Taking the average yields over the two crops, B.48392 has given the heaviest yield of cane, followed by B.41227, B.4098, B.4881 and B.41211. B.48392, unfortunately, has a very poor juice, and B.4881 tends to arrow heavily under these conditions and is very high in fibre.

TABLE XXVI
Soil Type:—Group II(c) Third Year Seedling Trials—First Ratoons
Cottage — Cut—28th and 29th April, 1953

VARIETY	TONS CANE PER ACRE			Z.H.R. BRIX			% SUCROSE IN JUICE			PURITY			No. of ROTTEN CANES PER PLOT		
	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean
B.37161 ...	39.88	38.13	39.01	21.0	22.5	21.8	18.5	20.1	19.3	*	90.4	90.4	34	15	25
B.4098 ...	39.81	34.56	37.19	21.4	23.9	22.7	19.0	20.4	19.7	—	88.3	88.3	30	14	22
B.41211 ...	37.79	37.74	37.77	21.0	23.0	22.0	17.9	19.4	18.7	—	85.9	85.9	18	30	24
B.41227 ...	45.65	44.08	44.87	21.1	22.8	22.0	18.2	20.4	19.3	—	89.9	89.9	29	26	28
B.4851 ...	46.22	35.30	40.76	21.4	21.5	21.5	18.8	18.7	18.8	—	87.2	87.2	23	48	36
B.4881 ...	43.16	43.01	43.09	20.7	21.6	21.2	17.2	18.4	17.8	—	86.2	86.2	21	11	16
B.4888 ...	36.96	41.57	39.27	21.3	22.7	22.0	18.4	20.5	19.5	—	89.5	89.5	19	11	15
B.48117 ...	38.02	33.18	35.60	21.4	22.9	22.2	19.1	19.7	19.4	—	87.1	87.1	8	9	9
B.48126 ...	40.74	36.15	38.45	20.9	22.7	21.8	17.3	20.1	18.7	—	91.5	91.5	20	22	21
B.48177 ...	39.89	34.12	37.01	20.8	22.0	21.4	17.0	19.0	18.0	—	84.6	84.6	39	41	40
B.48179 ...	35.61	34.34	34.98	21.1	21.3	21.2	18.2	17.6	17.9	—	85.5	85.5	23	34	29
B.48259 ...	34.38	33.22	34.30	20.8	22.1	21.5	15.9	19.7	17.8	—	89.9	89.9	38	62	50
B.48330 ...	31.61	33.76	32.74	21.5	23.1	22.3	19.1	20.8	20.0	—	90.7	90.7	91	40	66
B.48332 ...	41.12	37.59	39.36	21.4	22.5	22.0	18.6	19.8	19.2	—	87.7	87.7	13	11	12
B.48392 ...	55.50	39.87	47.69	17.9	21.6	19.8	14.0	16.6	15.3	—	78.8	78.8	41	22	32

*Purity figures were not obtained for the plant cane crop.

A difference of ± 3.87 tons cane per acre between mean yields may be considered significant.

In this trial, B.41227 gave the heaviest yield of ratoon cane and was significantly better than any of the other varieties under trial with the exception of B.4881 and B.4888. Taking the yields of the two crops, B.48392 has given the heaviest yield of cane, but its juice quality is so poor that it cannot be considered for commercial cultivation.

B.48330 had the best juice, followed by B.4888, B.4098 and B.41227.

TABLE XXVII

Soil Type:—Group II(c) Third Year Seedling Trials—Second Ratons

Portland — Cut—19th and 20th February, 1953

VARIETY	TONS CANE PER ACRE				Z.H.R. BRIX				% SUCROSE IN JUICE				PURITY				No. OF ROTTEN CANES PER PLOT			
	Plant	1st Rtns.	2nd Rtns.	Mean	Plant	1st Rtns.	2nd Rtns.	Mean	Plant	1st Rtns.	2nd Rtns.	Mean	Plant	1st Rtns.	2nd Rtns.	Mean	Plant	1st Rtns.	2nd Rtns.	Mean
B.37161 ...	46.71	39.10	38.10	41.30	18.2	20.4	20.2	19.6	14.7	18.1	17.4	16.7	*	*	89.2	89.2	15	32	6	18
B.4098 ...	50.91	40.03	37.38	42.77	19.4	20.5	19.7	19.9	16.4	16.9	17.4	16.9	—	—	87.6	87.6	14	34	9	19
B.41211 ...	43.97	25.72	41.42	36.04	19.0	21.4	18.2	19.5	15.8	16.7	14.4	15.6	—	—	80.9	80.9	61	176	3	80
B.4466 ...	51.72	51.36	40.42	47.83	18.0	21.4	19.6	19.7	16.0	19.2	16.1	17.1	—	—	86.8	86.8	12	14	4	10
B.46103 ...	51.16	46.53	35.43	44.37	18.2	21.0	20.5	19.9	15.6	17.6	18.2	17.1	—	—	89.3	89.3	12	29	4	15
B.4738 ...	50.34	46.66	39.76	45.59	18.7	21.7	19.9	20.1	15.5	19.5	15.2	16.7	—	—	84.4	84.4	11	21	3	12
B.4743 ...	47.78	46.50	41.37	45.22	18.7	20.8	19.0	19.5	15.4	15.7	15.0	15.4	—	—	81.9	81.9	8	23	5	12
B.4744 ...	54.42	55.64	37.45	49.17	18.3	20.7	20.4	19.8	15.5	17.3	17.8	16.9	—	—	88.6	88.6	14	55	3	24
B.4747 ...	54.63	47.37	43.56	48.85	18.3	20.4	19.4	19.4	14.9	16.8	17.2	16.3	—	—	86.3	86.3	20	86	4	37
B.4781 ...	52.92	47.87	43.29	48.03	19.0	22.2	21.4	20.9	16.9	17.9	17.9	17.6	—	—	88.4	88.4	13	18	5	12
B.4788 ...	50.99	42.50	42.02	45.17	19.1	20.8	20.3	20.1	15.4	17.5	17.1	16.7	—	—	88.0	88.0	11	29	6	15
B.47135 ...	56.28	49.47	45.27	50.34	17.3	21.1	17.7	18.7	14.9	17.0	15.0	15.6	—	—	88.7	88.7	12	42	4	19
B.47151 ...	47.19	52.32	44.98	38.16	18.0	20.9	20.6	19.8	15.5	15.6	17.1	16.1	—	—	86.9	86.9	13	37	5	18
B.47162 ...	48.37	42.65	41.85	44.29	18.8	21.3	20.6	20.2	15.6	18.7	17.2	17.2	—	—	88.4	88.4	9	46	1	19
B.47204 ...	56.54	48.56	34.60	46.57	18.7	19.3	18.6	18.9	14.7	16.9	17.3	16.3	—	—	86.4	86.4	20	34	7	20
B.47214 ...	45.45	37.47	32.34	38.42	17.5	20.2	18.4	18.7	14.0	16.9	14.2	15.0	—	—	84.7	84.7	24	42	4	23
B.47216 ...	41.12	36.94	31.07	36.38	17.0	19.6	18.0	18.2	13.1	14.9	14.8	14.3	—	—	85.8	85.8	14	35	5	18
B.47217 ...	44.36	38.77	28.67	37.27	17.2	19.7	18.1	18.3	13.3	15.0	13.3	17.2	—	—	82.1	82.1	19	36	4	20
B.47233 ...	54.00	35.77	33.23	41.00	19.1	20.8	20.1	20.0	14.7	17.7	16.7	16.4	—	—	86.6	86.6	20	42	6	23
B.47258 ...	35.59	26.92	41.39	34.63	18.8	22.0	20.4	20.4	15.8	19.2	17.3	17.4	—	—	87.2	87.2	34	103	4	47
B.47314 ...	49.53	51.09	36.16	45.59	18.7	22.1	20.3	20.4	15.4	16.7	16.5	16.2	—	—	87.3	87.3	10	9	4	8
B.47379 ...	44.87	44.86	38.11	42.61	17.9	21.0	19.2	19.4	14.4	17.3	15.6	15.8	—	—	85.3	85.3	15	23	4	14
B.47380 ...	48.22	32.39	31.36	37.32	20.2	22.6	21.8	21.5	17.1	19.8	17.4	18.1	—	—	90.2	90.2	17	44	2	21
B.47397 ...	51.82	42.14	33.16	42.71	18.8	19.9	18.2	19.0	15.2	13.4	15.4	14.7	—	—	82.0	82.0	14	27	4	15
B.47419 ...	54.36	40.28	41.11	45.25	17.7	20.0	19.2	19.0	15.4	16.8	17.4	16.5	—	—	87.3	87.3	25	103	5	44

*Purity figures for the plant cane and first ratoon crops were not obtained.

A difference of ± 6.93 tons cane per acre may be considered significant.

In this trial, B.47135 gave the heaviest yield of ratoon cane followed by B.45151, B.4747, B.4781, B.4788, B.47162 and B.41211. However, only B.47135 proved to be significantly better than the standard variety, B.37161, and none was significantly better than the standard, B.41211. B.46103 gave the best quality juice followed by B.4781, B.4744, B.47380, B.47419, B.4098 and B.37161.

Taking the average yields over the three crops, B.47135 has given the heaviest yield of cane, followed by B.4744, B.4747 and B.4781.

B.47135 holds its trash very strongly, and has a poor juice, making it unsuitable for commercial cultivation. B.4744 has already been distributed for trial on a commercial scale. B.4747 is very thin and difficult to clean and B.4781 has not done so well in other trials. An interesting feature of this trial is the performance of B.47258, which was very good in this crop, but suffered severely as a plant cane and first ratoon from rats and weevil borer damage.

TABLE XXVIII

Soil Type:—Group II(c) Third Year Seedling Trials—Second Ratoons
Easy Hall — Cut—30th April and 1st May, 1953

VARIETY	TONS CANE PER ACRE				Z.H.R. BRIX				% SUCROSE IN JUICE				PURITY				No. of ROTTEN CANES PER PLOT			
	Plant	1st Rtns.	2nd Rtns.	Mean	Plant	1st Rtns.	2nd Rtns.	Mean	Plant	1st Rtns.	2nd Rtns.	Mean	Plant	1st Rtns.	2nd Rtns.	Mean	Plant	1st Rtns.	2nd Rtns.	Mean
B.37161 ...	45.60	38.24	34.22	39.35	18.3	21.8	21.1	20.4	15.4	18.4	19.6	17.8	*	*	92.9	92.9	11	18	15	15
B.4098 ...	47.78	39.57	37.99	41.78	19.0	21.2	21.8	20.4	16.2	18.2	19.8	18.1	—	—	91.3	91.3	8	26	16	17
B.4121 ...	56.73	39.49	34.53	43.58	18.8	21.2	21.9	20.6	13.7	17.6	18.9	16.7	—	—	87.6	87.6	23	83	27	44
B.4466 ...	49.15	42.82	33.89	41.95	19.0	21.2	21.4	20.5	15.7	19.2	18.7	17.9	—	—	91.0	91.0	8	15	15	13
B.46103 ...	43.94	35.90	29.86	36.57	19.3	21.6	22.7	21.2	16.6	18.3	20.4	18.4	—	—	92.5	92.5	10	37	17	21
B.4738 ...	47.29	46.02	41.49	44.93	18.5	21.1	20.9	20.2	16.2	18.1	19.2	17.8	—	—	90.2	90.2	9	23	18	17
B.4743 ...	49.14	43.56	40.97	44.56	18.4	20.0	20.8	19.7	15.1	17.3	17.9	16.8	—	—	88.3	88.3	7	22	15	15
B.4744 ...	76.05	53.11	42.44	57.20	19.5	21.3	21.5	20.8	16.5	17.7	19.3	17.8	—	—	90.7	90.7	12	28	25	22
B.4747 ...	51.03	45.01	34.57	43.54	18.6	20.2	21.5	20.1	15.9	18.1	18.7	17.6	—	—	89.5	89.5	14	44	25	28
B.4781 ...	53.64	41.32	38.57	44.51	18.5	21.9	21.4	20.6	15.7	19.3	18.5	17.8	—	—	89.6	89.6	11	22	23	19
B.4788 ...	45.63	37.85	35.89	39.79	18.3	20.9	22.3	20.5	16.2	18.3	19.9	18.1	—	—	91.4	91.4	11	38	13	21
B.47135 ...	58.30	43.78	40.61	47.56	17.4	20.7	21.0	19.7	12.9	18.4	19.1	16.8	—	—	91.0	91.0	8	50	22	27
B.47151 ...	52.74	46.25	39.67	46.22	18.9	20.7	21.0	20.2	15.7	17.1	18.4	17.1	—	—	88.8	88.8	23	16	21	20
B.47162 ...	52.03	44.39	38.58	45.00	18.0	21.7	21.9	20.3	15.4	19.5	19.7	18.2	—	—	91.3	91.3	9	24	19	17
B.47204 ...	53.42	44.87	41.24	46.51	18.0	18.3	20.9	19.1	14.9	16.7	18.6	16.7	—	—	87.1	87.1	20	27	20	22
B.47214 ...	45.01	28.65	25.41	33.02	17.7	20.2	20.7	19.5	13.7	17.0	18.9	16.5	—	—	91.1	91.1	18	47	31	32
B.47216 ...	53.67	36.55	28.38	39.53	17.2	20.1	21.2	19.5	12.5	16.6	18.4	15.8	—	—	91.8	91.8	12	32	12	19
B.47217 ...	52.40	32.00	27.58	37.33	17.5	20.4	20.5	19.5	14.1	16.3	18.8	16.4	—	—	90.5	90.5	18	44	23	28
B.47233 ...	48.03	32.72	29.79	36.85	19.0	20.5	21.3	20.3	15.1	18.2	19.3	17.5	—	—	91.2	91.2	15	43	26	28
B.47258 ...	53.07	43.77	41.85	46.23	19.2	22.4	23.1	21.6	16.6	20.0	21.2	19.3	—	—	91.4	91.4	9	17	14	13
B.47314 ...	50.38	50.82	40.81	47.34	19.1	21.8	21.9	20.9	17.1	18.6	19.5	18.4	—	—	90.0	90.0	7	9	18	11
B.47379 ...	59.55	39.18	34.21	44.25	19.0	20.9	21.3	20.4	15.8	18.0	18.8	17.5	—	—	90.1	90.1	8	20	14	14
B.47380 ...	49.51	33.36	30.59	37.82	20.1	23.1	22.5	21.9	17.6	19.9	20.8	19.4	—	—	92.5	92.5	7	52	16	25
B.47397 ...	51.88	36.97	31.24	40.03	18.8	19.4	20.9	19.7	15.3	15.6	17.3	16.1	—	—	82.2	82.2	15	36	15	22
B.47419 ...	65.39	46.12	36.89	49.47	18.7	21.7	22.4	20.9	16.4	19.1	19.6	18.4	—	—	91.8	91.8	16	35	25	25

*Purity figures for plant cane and first ratoon crops were not obtained.
A difference of ± 4.19 tons cane per acre may be considered significant.

In this trial, B.4744 gave the heaviest yield of second ratoon cane and was significantly better than any of the standard varieties. This was followed by B.47258, B.4738 and B.47204, all of which were significantly better than the standard varieties, B.37161 and B.41211, but not better than B.4098.

Taking the average yields over the three crops, B.4744 has given the heaviest yield of cane followed by B.47419, B.47135 and B.47314. B.47258 has also given a good yield of cane and has an excellent juice. This variety is being tried further in Select Seedling Trials. B.4738 arrows heavily under these conditions, but may be useful in the low and intermediate rainfall areas, where arrowing is not such a limiting factor.

TABLE XXIX

Soil Type:—Group II(c) Third Year Seedling Trials—Third Ratoons

Kendal — Cut—4th and 5th May, 1953

VARIETY	TONS CANE PER ACRE						Z.H.R. BRIX						% SUCROSE IN JUICE						PURITY					No. of ROTTEN CANES PER PLOT				
	Plant	1st	Rtns.	2nd	Rtns.	Mean	Plant	1st	Rtns.	2nd	Rtns.	3rd	Rtns.	Mean	Plant	1st	Rtns.	2nd	Rtns.	3rd	Rtns.	Mean	Plant	1st	Rtns.	2nd	Rtns.	3rd
B. 37161	44.71	53.89	45.77	35.42	44.95	22.0	20.8	20.9	23.3	21.8	18.9	17.1	19.1	20.8	19.0	*	*	—	—	—	—	91.4	91.4	7	12	17	25	15
B. 4098	46.17	51.56	45.87	41.97	46.39	22.9	21.2	21.2	23.8	22.3	19.2	18.4	17.8	21.4	19.2	—	—	—	—	—	—	89.8	89.8	13	8	20	11	13
B. 4502	41.60	42.40	28.08	27.51	34.90	23.2	21.5	22.7	24.2	22.9	19.9	18.2	19.7	22.0	20.0	—	—	—	—	—	—	93.0	93.0	18	16	56	19	27
B. 4503	39.78	51.15	37.65	35.42	41.00	21.1	18.6	20.0	22.2	20.5	18.2	15.8	18.1	20.3	18.1	—	—	—	—	—	—	90.0	90.0	11	13	25	18	17
B. 4504	41.21	51.61	40.00	35.34	42.04	22.7	19.7	20.9	22.7	21.5	18.9	15.9	18.1	21.5	18.6	—	—	—	—	—	—	92.2	92.2	19	10	23	22	19
B. 4506	39.26	46.53	30.30	29.15	36.31	21.2	18.8	20.4	22.3	20.7	18.4	16.4	18.5	19.6	18.2	—	—	—	—	—	—	89.2	89.2	10	12	31	13	17
B. 4556	41.87	42.86	21.50	22.50	32.13	21.8	20.5	20.7	23.1	21.5	18.8	17.7	18.6	21.0	19.0	—	—	—	—	—	—	90.4	90.4	22	17	56	16	28
B. 4572	45.26	41.87	22.25	24.19	33.39	23.2	20.6	21.1	23.4	22.1	19.9	18.4	17.8	21.4	19.4	—	—	—	—	—	—	91.4	91.4	6	10	32	15	16
B. 4596	49.32	55.32	47.51	36.33	47.12	21.6	18.6	19.8	22.8	20.7	18.1	16.7	17.7	20.2	18.2	—	—	—	—	—	—	89.6	89.6	11	20	19	14	16
B. 45137	39.25	51.39	49.90	42.63	45.79	23.1	20.0	21.2	24.2	22.1	20.7	18.4	19.5	22.0	20.2	—	—	—	—	—	—	89.3	89.3	20	15	13	11	15
B. 45151	50.69	61.14	48.53	46.04	51.60	22.1	21.3	22.3	24.8	22.6	21.7	18.4	19.4	22.9	20.6	—	—	—	—	—	—	92.5	92.5	10	7	28	18	16
B. 4604	52.14	56.75	38.77	35.55	45.80	21.6	19.5	20.7	23.3	21.3	19.0	17.2	18.1	19.8	18.5	—	—	—	—	—	—	91.8	91.8	6	8	7	12	8
B. 4681	50.68	54.39	14.84	33.37	38.32	22.3	20.4	21.3	24.2	22.1	19.6	18.3	18.1	21.7	19.4	—	—	—	—	—	—	90.0	90.0	10	6	27	15	15
B. 4691	31.21	55.83	30.54	36.26	38.46	21.7	19.3	20.7	22.5	21.1	19.1	16.4	17.7	19.7	18.2	—	—	—	—	—	—	92.4	92.4	32	24	194	14	64
B. 46102	49.56	50.21	47.01	42.72	47.38	21.5	19.9	20.7	22.7	21.2	18.7	16.1	18.6	18.9	18.1	—	—	—	—	—	—	89.5	89.5	9	8	87	39	14
B. 46136	45.44	52.72	43.96	37.42	44.89	22.5	20.5	21.2	23.6	21.9	19.3	17.6	18.1	21.5	19.1	—	—	—	—	—	—	91.4	91.4	7	9	17	10	11
B. 46223	53.44	62.12	46.69	42.69	51.24	22.3	20.6	21.6	23.4	22.0	18.8	17.7	17.0	19.4	18.2	—	—	—	—	—	—	85.4	85.4	9	31	53	22	29
B. 46232	39.56	43.16	37.81	33.29	38.46	19.7	18.2	19.4	22.5	20.0	17.7	15.3	18.0	18.7	17.4	—	—	—	—	—	—	87.7	87.7	11	18	22	10	15
B. 46284	37.75	39.67	29.48	27.11	33.50	22.4	19.9	21.8	23.8	22.0	19.2	16.8	19.2	21.0	19.1	—	—	—	—	—	—	90.3	90.3	9	7	18	12	12
B. 46288	34.65	46.14	37.87	31.12	37.45	22.0	19.8	21.1	23.7	21.7	19.7	16.4	19.1	21.5	19.2	—	—	—	—	—	—	81.7	81.7	13	13	9	11	12
B. 46364	46.41	57.52	54.57	—	52.83	22.5	20.1	21.0	—	—	21.2	20.2	18.0	18.7	19.0	—	—	—	—	—	—	—	6	6	9	—	7	—
B. 46394	25.20	39.06	35.59	32.35	33.05	21.7	20.5	22.4	23.6	22.1	19.3	18.1	19.4	22.1	19.2	—	—	—	—	—	—	91.3	91.3	9	8	18	9	11
S. 45	44.99	38.17	28.76	28.87	35.20	22.0	20.4	20.8	24.0	21.8	18.0	17.4	17.5	20.6	18.4	—	—	—	—	—	—	87.8	87.8	12	12	23	12	15

*Purity figures were not obtained for the plant cane, first and second ratoon crops.

A difference of ± 6.39 tons cane per acre between mean yields may be considered significant.

In this trial, the plots of B.46364 were unfortunately cut out by the plantation for planting material. B.45151 gave the heaviest yield of third ratoon cane, followed by B.46102, B.46223, B.45137, B.45152 and B.4098. All of these varieties proved to be significantly better than the standard variety, B.37161. However, none of the varieties was significantly better than the standard variety, B.4098.

Taking the average yields over the four crops, B.45151 has given the heaviest yield of cane and has the best juice quality of the lot. This was followed by B.46223, which is now considered to be the same as B.41211, B.45152, which also has a very good juice but is very dirty and difficult to cut, B.46102 and B.4596. B.46364 also did very well in this trial but, as was mentioned above, it cannot be considered here, as the plots had been cut for planting material by the plantation.

B.45151 has been issued to plantations for trial on a commercial scale, while B.46364 is being put into Select Seedling Trials in the high rainfall areas.

TABLE XXX

Soil Type:— Group II (c) Select Seedling Trials—Plant Canes

Applewhaites—Cut—18th March, 1953

Bowmanston—Cut—15th April, 1953

Variety	TONS CANE PER ACRE		TONS SUGAR PER ACRE		% SUCROSE IN CANE		QUOTIENT OF PURITY		NO. OF ROTTEN CANES PER PLOT	
	Apple- whaites	Bow- manston	Apple- whaites	Bow- manston	Apple- whaites	Bow- manston	Apple- whaites	Bow- manston	Apple- whaites	Bow- manston
B.37161	44.08	42.41	6.04	6.71	13.7	15.8	89.5	90.5	24	37
B.41211	45.44	41.59	6.69	6.33	14.7	15.3	88.4	84.2	55	55
B.45151	48.61	44.21	7.33	7.77	15.1	17.6	90.0	91.9	20	40
B.4744	51.88	49.63	7.69	7.91	14.8	15.9	88.9	88.1	26	53
B.47419	49.90	42.42	7.31	7.18	14.6	16.9	88.6	91.1	28	51

The following differences between mean yields may be considered significant:—

Applewhaites ± 3.39 tons cane per acre & ± 0.64 tons sugar per acre.
Bowmanston Insignificant ± 1.02 tons sugar per acre.

At Applewhaites, B.4744 and B.47419 were significantly better than B.37161 and B.41211 on cane. B.45151 significantly outyielded B.37161 but not B.41211 on cane. B.4744, B.45151 and B.47419 significantly outyielded B.37161 on sugar, but did not prove to be significantly better than B.41211.

At Bowmanston, B.4744 gave the heaviest yield of cane followed by B.45151, B.47419 and B.37161. Differences between mean yields were not significant. B.4744 and B.45151 proved to be significantly better than B.37161 and B.41211 on sugar yield. The juice quality of B.45151 was the best and the purity highest in both trials.

TABLE XXXI

*Soil Type:— Group IV (b) Third Year Seedling Trials—Plant Canes**Carrington—Cut—6th and 9th March, 1953*

VARIETY	Tons Cane per Acre	Z.H.R. Brix	% Sucrose in Juice	Purity	No. of Rotten Canes per Plot
B.37161 ...	42.51	21.1	18.9	89.6	9
B.41211 ...	37.28	20.8	18.6	88.0	64*
B.4744 ...	51.27	21.9	19.9	89.1	17
B.47419 ...	33.59	21.1	19.0	88.2	93*
B.4906 ...	34.60	23.5	21.2	88.2	7
B.4942 ...	39.48	22.7	19.9	88.4	14
B.4956 ...	42.28	19.9	17.1	86.5	22
B.4966 ...	43.85	21.6	19.0	87.0	16
B.49122 ...	34.58	20.0	18.3	88.0	20
B.49186 ...	36.63	20.6	18.5	87.3	23
B.49198 ...	43.61	20.1	17.5	83.5	11
B.49229 ...	33.48	21.8	20.3	88.6	13
B.49257 ...	50.99	18.7	16.5	85.6	29
B.49301 ...	38.77	21.4	18.9	87.3	18
B.49309 ...	37.32	21.3	20.4	90.3	17
B.49311 ...	39.29	21.6	20.2	86.8	13
B.49346 ...	31.62	19.5	16.3	80.1	64*
B.49353 ...	40.15	21.3	18.7	88.4	16
B.49355 ...	33.61	21.6	18.6	87.1	12
B.49376 ...	35.28	19.2	17.9	87.3	92*

These varieties suffered heavily from rat damage.A difference of ± 6.62 tons cane per acre between mean yields may be considered significant.*

In this trial, B.4744 gave the heaviest yield of plant cane followed by B.49257. Both of these varieties significantly outyielded all other varieties tried. B.49257 has a very poor juice and tends to rot relatively early in the crop which precludes its use as a commercial variety.

B.4906 had the best juice followed by B.49309, B.49229, B.49311 and B.4744.

TABLE XXXII
Soil Type:— Group IV(b) Third Year Seedling Trials—First Ratons
Belle — Cut—9th and 10th April, 1953

VARIETY	TONS CANE PER ACRE			Z.H.R. BRIX			% SUCROSE IN JUICE			PURITY			No. OF ROTTEN CANES PER PLOT		
	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean	Plant Canes	1st Rtns.	Mean
B. 37161	40.90	35.87	38.39	20.8	22.6	21.7	18.8	21.0	19.9	—	91.2	91.2	7	7	7
B. 4098	47.86	41.52	44.69	21.3	22.5	21.9	18.9	19.3	19.1	—	83.9	83.9	7	4	6
B. 41211	45.77	40.82	43.30	19.9	21.7	20.8	18.5	19.7	19.1	—	87.1	87.1	8	3	6
B. 41227	46.48	39.39	43.44	20.3	22.1	21.2	18.0	20.3	19.2	—	87.2	87.2	9	8	9
B. 4851	46.26	33.91	40.09	20.4	22.1	21.3	18.8	19.2	19.0	—	84.1	84.1	4	5	5
B. 4881	43.89	36.18	40.04	19.0	21.3	19.7	15.3	18.4	16.9	—	85.5	85.5	8	4	6
B. 4888	45.22	36.26	40.74	20.6	22.1	21.4	16.7	19.6	18.2	—	87.3	87.3	4	7	6
B. 48117	38.46	30.49	34.48	21.2	22.7	22.0	16.7	18.9	17.8	—	83.6	83.6	6	5	6
B. 48126	39.46	28.74	34.10	19.8	22.3	21.1	16.6	19.7	18.2	—	89.1	89.1	5	4	5
B. 48177	45.65	38.54	42.30	20.3	22.0	21.2	16.6	18.5	17.6	—	84.3	84.3	24	13	19
B. 48179	39.24	36.00	37.62	19.8	21.5	20.7	17.4	18.5	18.0	—	85.4	85.4	4	7	6
B. 48259	41.77	29.26	35.52	19.2	22.1	20.7	17.8	20.5	19.2	—	89.7	89.7	23	9	16
B. 48330	43.03	29.88	36.46	20.9	22.7	21.8	18.1	20.9	19.5	—	89.4	89.4	38	23	31
B. 48332	42.80	30.95	36.88	20.1	21.6	20.9	17.6	18.8	18.2	—	85.7	85.7	4	6	5
B. 48392	62.29	39.14	50.72	19.1	21.3	20.2	16.2	17.7	17.0	—	80.0	80.0	3	7	5

*Purity figures were not obtained for the plant cane crop.

A difference of ± 4.69 tons cane per acre between mean yields may be considered significant.

In this trial, the standard variety, B.4098, gave the heaviest yield of ratoon cane, followed by B.41211, B.41227 and B.48392. The differences between the mean yields of these varieties cannot be shown to be significant.

Taking the average yields over the two crops, B.48392 has given the heaviest yield of cane, followed by B.4098, B.41227 and B.41211. The juice quality of B.48392 is so poor that it cannot be recommended for commercial purposes. None of the other varieties of the B.48' series gave yields comparable with those given by the standard varieties, B.4098, B.41227 and B.41211 under the conditions of this trial.

TABLE XXXIII
Soil Type:— Group IV(b) Third Year Seedling Trials — Second Ratoons
Carrington — Cut—13th and 14th April, 1953

VARIETY	TONS CANE PER ACRE				Z.H.R. BRIX				% SUCROSE IN JUICE				PURITY				No. of ROTTEN CANES PER PLOT			
	Plant	Ist Rtns.	2nd Rtns.	Mean	Plant	Ist Rtns.	2nd Rtns.	Mean	Plant	Ist Rtns.	2nd Rtns.	Mean	Plant	Ist Rtns.	2nd Rtns.	Mean	Plant	Ist Rtns.	2nd Rtns.	Mean
B.37161 ...	47.01	41.43	40.38	42.94	20.1	20.7	22.2	21.0	16.7	17.7	19.6	18.0	*	*	89.6	89.6	15	10	15	13
B.4098 ...	47.86	40.33	36.93	41.71	9.6	22.3	22.4	22.4	19.4	18.9	18.9	19.1	—	—	84.0	84.0	6	8	18	11
B.41211 ...	36.50	43.26	37.34	39.03	21.3	19.6	22.5	21.1	17.9	16.5	18.7	17.7	—	—	83.1	83.1	96	7	31	45
B.4466 ...	48.06	31.26	34.10	37.81	19.9	21.1	21.3	20.8	16.7	17.4	18.7	17.6	—	—	89.9	89.9	14	9	18	14
B.46103 ...	47.84	32.09	31.92	37.28	20.7	20.6	21.8	21.0	17.9	17.5	19.1	18.2	—	—	87.6	87.6	13	3	18	11
B.4738 ...	45.79	46.08	44.41	45.43	21.1	20.6	22.3	21.3	18.9	17.8	20.8	19.2	—	—	89.5	89.5	15	4	13	11
B.4743 ...	45.30	33.71	35.06	38.02	21.1	20.8	21.8	21.2	17.9	18.0	18.8	18.2	—	—	85.1	85.1	13	3	17	11
B.4744 ...	55.35	41.36	34.61	43.77	22.0	22.3	22.6	22.3	19.3	19.1	20.3	19.6	—	—	88.4	88.4	11	5	19	12
B.4747 ...	39.10	44.59	42.06	41.92	21.2	20.5	22.3	21.3	19.1	18.3	19.3	18.9	—	—	87.0	87.0	64	9	20	31
B.4764 ...	45.20	35.60	34.18	38.33	22.3	21.8	22.1	22.1	19.1	18.3	19.0	18.8	—	—	84.4	84.4	11	5	15	10
B.4781 ...	46.40	33.56	36.60	38.85	21.2	21.6	22.4	21.7	17.4	18.7	19.5	18.5	—	—	87.9	87.9	18	4	15	12
B.4788 ...	46.26	36.92	33.98	39.05	22.5	21.8	22.9	22.4	19.3	17.6	19.3	18.7	—	—	85.5	85.5	7	3	10	7
B.47135 ...	50.96	41.74	40.86	44.35	19.6	20.2	21.8	20.5	17.1	17.4	19.4	18.0	—	—	89.5	89.5	8	4	8	7
B.47147 ...	39.92	34.09	36.07	36.69	20.0	21.0	21.5	20.8	17.2	17.3	18.7	17.7	—	—	87.6	87.6	35	4	10	16
B.47151 ...	39.66	33.89	38.51	37.35	20.0	20.2	22.2	20.8	17.6	17.8	18.8	18.1	—	—	84.7	84.7	23	9	13	15
B.47162 ...	44.13	37.79	39.17	40.36	20.9	21.4	21.6	21.3	17.1	18.7	19.4	18.4	—	—	88.1	88.1	36	2	16	18
B.47214 ...	45.73	29.74	25.84	33.77	20.0	20.8	21.1	20.6	17.0	17.7	19.2	18.0	—	—	89.9	89.9	11	7	22	13
B.47216 ...	48.09	31.21	29.63	35.31	19.9	20.3	22.0	21.1	17.0	18.0	19.0	18.0	—	—	89.4	89.4	16	5	28	16
B.47217 ...	43.31	28.17	19.68	30.39	19.3	20.9	21.7	20.6	15.8	17.8	19.2	17.6	—	—	89.3	89.3	16	8	27	17
B.47258 ...	45.68	36.48	40.18	42.22	22.2	21.8	23.2	22.5	19.7	19.1	21.3	20.0	—	—	90.2	90.2	11	3	15	10
B.47314 ...	42.95	34.61	30.22	35.93	21.7	21.8	22.1	21.9	16.8	17.4	19.2	19.3	—	—	88.8	88.8	9	4	14	9
B.47379 ...	45.87	32.48	34.80	37.72	20.5	20.2	22.4	21.0	16.8	17.4	19.2	17.8	—	—	88.9	88.9	9	6	13	9
B.47880 ...	38.37	34.48	30.70	34.52	22.6	23.3	24.0	23.3	20.2	19.0	21.0	20.1	—	—	89.0	89.0	12	4	24	13
B.47397 ...	44.68	34.28	32.04	37.00	20.8	19.9	21.5	20.7	16.9	16.0	17.3	16.7	—	—	79.1	79.1	20	7	28	18
B.47419 ...	51.88	40.75	35.23	42.62	21.4	20.2	22.5	21.4	19.0	17.4	20.3	18.9	—	—	89.7	89.7	19	10	25	18

* Purity figures for plant cane and first ratoon crops were not obtained.

A difference between mean yields of ± 4.33 tons cane per acre may be considered significant.

In this trial, B.4738 gave the heaviest yield of second ratoon cane followed by B.4747, B.37161 and B.47135. B.4738 just failed to outyield B.37161 significantly. The performance of B.47258 was satisfactory considering the excellence of its juice.

Taking the mean yields over the three crops, B.4738 has given the heaviest yield of cane, followed by B.47135, B.4744, B.37161 and B.47419. B.4738 has been included in Select Seedling Trials. B.47135 is very dirty and difficult to clean, while its juice quality can only be described as poor. B.4744 and B.47419 have been issued to plantations for trial on a commercial scale.

TABLE XXXIV

Soil Type:— Group IV (b) Select Seedling Trials—Plant Canes

Bulkeley—Cut—2nd March, 1953

VARIETY	Tons Cane per Acre	Tons Sugar per Acre	% Sucrose in Cane	Purity	No. of Rotten Canes per Plot
B.37161 ...	40.09	5.62	14.1	87.9	15
B.41211 ...	30.65	4.17	13.8	84.6	223*
B.45151 ...	34.99	5.54	15.8	87.9	107.*
B.4744 ...	46.97	6.88	14.8	85.9	30
B.47419 ...	38.90	5.86	15.2	86.0	75

*Damaged by rats.

A difference of ± 3.94 tons cane per acre and ± 0.45 tons sugar per acre may be considered significant.

In this trial, B.4744 significantly outyielded all other varieties tried on cane and sugar. B.37161 gave the second heaviest yield of plant cane and was significantly better than B.45151 and B.41211. B.47419 was significantly better than B.41211. B.41211, B.45151 and, to a lesser extent, B.47419, suffered heavily from rat damage. B.47419 gave the second heaviest yield of sugar followed by B.37161 and B.45151. All of these varieties were significantly better than B.41211. It is interesting to note that although B.45151 gave over five tons of cane per acre less than B.37161, its juice quality was so good that its sugar yield was only 0.08 tons per acre less.

SUMMARY

Third Year Seedling Trials

Plant Canes. B.49257 gave heavy yields of plant cane, but the juice quality was so poor that it cannot be considered for commercial cultivation.

B.49311 has an excellent juice and has given some fairly good yields of plant cane particularly in the high rainfall areas, but it tends to flower rather too freely for Barbados conditions. None of the other varieties of the B.49' series appears to have commercial possibilities.

First Ratoons. B.48392 has given some good yields of plant and ratoon cane, but its juice quality is so poor that it cannot be considered for commercial planting.

None of the other varieties of the B.48' series appears to have commercial possibilities.

Second Ratoons. In the low and intermediate rainfall areas, B.4738 has performed exceptionally well. It tends to flower too freely to be at its best in the high rainfall areas. The canes are of medium-width, yellow in colour, and shed their trash readily. The juice quality is quite good, and little rotting has been observed in the trials. This variety is being taken through the Select Seedling Trials, as it may be useful commercially in the low and intermediate rainfall areas.

B.4744 has given heavy yields of ratoon cane in the high rainfall areas, but appears to be no better, or slightly poorer, than B.37161 in the low and intermediate rainfall areas. However, this variety gives such heavy plant cane yields that the difference in the ratoon crop yields is usually more than made up.

B.4747 has given some very heavy yields of plant and ratoon cane. However, it is very thin and twisty, which makes it difficult to cut and clean. Its juice quality is also variable and not outstanding. For these reasons, it is not possible to recommend this variety for trial on a commercial scale.

B.47258 has given moderately good yields of plant and ratoon cane, and has an excellent juice. It is a medium-width cane which sheds its trash readily, and so far has failed to flower. It may be a useful variety commercially in the high and intermediate rainfall areas, and it will be taken through the Select Seedling Trial stage.

B.47380 has already been planted in Select Seedling Trials to see if it could be useful for early reaping in the high rainfall areas. It is a medium-width reddish cane which sheds its trash readily and has an excellent juice. Its cane yields, however, are not outstanding.

B.47419 has been given to plantations for trial on a commercial scale. It is capable of giving heavy plant cane and ratoon yields of fairly good juice quality, but is rather well liked by rats and is inclined to rot if not cut fairly early.

It should be remembered that there has been no really dry season since the B.47' series has been under trial. For this reason, it is felt that none of the varieties of this series can be recommended on a large scale.

Third Ratoons. Only one trial was cut in the high rainfall area. B.45151 was the outstanding variety cut in this trial. It has averaged over fifty tons of cane per acre over four crops and has an excellent juice. Its main drawback appears to be that individual canes are thin. This variety has been distributed to planters and has been recommended for trial in the high rainfall areas only.

B.46223 has also given heavy yields of cane in this trial. However, it is indistinguishable from B.41211 in the field and, as it also has the same chromosome number, this variety along with B.46397 will, in future, be known as B.41211.

Select Seedling Trials

Plant Canes. In the high rainfall and valley soil areas B.4744 has given the heaviest yields of plant cane and sugar. In the intermediate and dry rainfall areas yields were variable, but in none of these trials could the differences between mean yields of the various varieties be shown to be significant.

B.47419 also gave some good yields of plant cane in the high rainfall areas, but does not appear to like the low and intermediate rainfall areas so well.

B.45151 has done exceptionally well in the high rainfall areas, where it has outyielded the standard variety, B.37161, by over one ton of sugar per acre in each trial. This variety is known to be a strong ratooner, so it should do well in this area. It has been given to plantations for trial on a commercial scale in the high rainfall areas, where it will be used for early reaping, although it shows no tendency to rot, and the juice quality goes on improving as the crop ripens.

First Ratoons. B.46223 and B.46397 have now been shown to be the same as B.41211. These varieties are indistinguishable botanically, and have the same chromosome number. They will, in future, be known as B.41211. All three of these varieties were better than B.37161 and B.4098 in the low rainfall areas.

II. DESPATCH OF SEEDLINGS TO CONTRIBUTING TERRITORIES

Cuttings of the selected varieties of the B.50' series were sent to the various contributing colonies in October, 1952. The varieties and the colonies to which they were sent are listed below:—

BRITISH GUIANA AND TRINIDAD

... B.49119, B.5011, B.5028, B.5037, B.5041, B.5047, B.5073, B.5098, B.50109, B.50112, B.50115, B.50126, B.50135, B.50141, B.50153, B.50155, B.50166, B.50184, B.50210, B.50267, B.50268, B.50275, B.50311, B.50345, B.50347, B.50352, B.50370 and B.50377.

In addition to the above, B.5019 was sent to British Guiana as well as forty-three breeding varieties for leaf scald tests.

ANTIGUA & ST. KITTS B.49119, B.5028, B.5037, B.5047, B.5098, B.50112, B.50126, B.50135, B.50141, B.50166, B.50184, B.50210, B.50267, B.50268, B.50275, B.50311, B.50347 and B.50377.

JAMAICA ... B.5012, B.5014, B.5032, B.5037, B.5041, B.5073, B.5082, B.50135, B.50141, B.50153, B.50184, B.50196, B.50206, B.50210, B.50340, B.50345, B.50347, B.50370, B.50377 and B.50378.

GRENADA ... B.45151.

In addition to the above, five hundred and ten varieties of the B.55' series representing twenty crosses were sent to Jamaica for testing, as well as 'fuzz' from twenty-eight crosses. These crosses have been selected as being likely to produce seedlings carrying resistance to mosaic disease.

DISTRIBUTION OF VARIETIES TO FOREIGN COUNTRIES

GUADELOUPE ... B.49119, B.5028, B.5037, B.5047, B.5098, B.50112, B.50126, B.50135, B.50141, B.50166, B.50184, B.50210, B.50267, B.50268, B.50275, B.50311, B.50347 and B.50377.

NIGERIA ... B.3439, B.34104 and B.37161.

III. PERFORMANCE OF VARIETIES IN CONTRIBUTING COLONIES

Barbados

The cane acreage in Barbados is still dominated by B.37161, which has continued to give a fairly satisfactory performance. The percentage under this variety continues to decrease steadily and it represented only 76.04% of the Island's crop for 1953. This reduction, although relatively small, reflects the opinion of planters, particularly in the high rainfall areas, that the variety is running out! However, the position is complicated by the presence of mealy-bug attacking fields in the high rainfall areas particularly. This pest is capable of causing an almost complete loss of crop in old ratoons, but can also cause quite considerable reductions of yield without the crop being an almost complete failure. The strong possibility that ratoon stunting is present in Barbados is a further complicating factor.

B.41211 has increased in acreage in the low and intermediate rainfall areas at the expense of B.37161 and now occupies 12.54% of the acreage under cane. It continues to give heavy yields of plant and ratoon cane and outyielded B.37161 on sugar per acre. The juice quality of this variety is inclined to be poor if the canes are cut before the crop is fully mature, but is quite satisfactory if the canes are cut when the crop is ripe.

B.4098 and B.41227 have increased slightly in acreage also at the expense of B.37161. These varieties are at their best in the areas of low to intermediate elevation with moderate to good rainfall, where arrowing is not a limiting factor.

The new varieties, B.45151, B.4744 and B.47419 were planted on a limited scale.

Variety percent. acreage figures for the 1951, 1952 and 1953 crops are given below :—

VARIETY				CROP YEAR		
				1951	1952	1953
B.37161	...	...	...	84.76	80.06	76.04
B.41211	...	...	...	6.58	9.74	12.54
B.4098	...	...	...	5.82	6.87	7.39
B.41227	...	...	...	0.76	0.89	1.01
B.43391	...	...	...	0.73	1.28	1.24
Mixed and others	...	...	...	1.35	1.16	1.78
				100.00	100.00	100.00

Jamaica

B.34104, the major variety, continued to decrease and represented only approximately 37% of the 1953 crop. The reduction in acreage is accounted for by increased plantings of the mosaic disease resistant varieties, B.37172, B.41227, B.42231 and B.4362. The acreage under B.37161, which is also susceptible to mosaic disease, has fallen slightly.

B.3439 maintained its acreage and continues to be favoured on the North Coast and under irrigation in the dry areas, where it gives good yields of excellent sucrose content.

B.37172 dominates the wet areas of the East and North-east Coast, where it gives heavy tonnages of good juice quality under poor ripening conditions. It has, however, been outyielded by B.4362 in some of the recent trials. In this area, B.4362 is reported to suffer from *Metamasius* damage and red rot.

The major variety percent. acreage figures for the 1952 and 1953 crops are given below :—

VARIETY	CROP YEAR	
	1952	1953
B.34104	50	37
B.3439	21	21
B.37172	7	9
B.4362	1	6
B.37161	7	6
B.41227	1	5
B.42231	2	4
B.3172	1	1

Trinidad

The variety acreage figures for the 1953 crop are not available at the time of writing, but the figure for the percentage of varieties planted for the 1954 crop reveal that B.37172 has been planted on 39.45% of the area replanted. This is followed by B.37161 with 25.06%, B.3337 with 18.66% and B.34104 with 12.01%; an interesting feature is that B.4362 appears to be gaining favour with its excellent juice and occupied 2.92% of the area replanted.

B.41227 has performed very well in trials, but does not appear to have found much favour on the plantations, as it has only been planted on 0.35% of the acreage planted in 1952.

The cane growing areas of Trinidad differ so markedly in environment and soil type that variety percent. acreage figures on an island basis can only have general significance, *e.g.* in the undulating areas of the South, the major variety, B.3337, is grown to a very limited extent. The relevant figures for the 1952 crop and planting season are given below:—

VARIETY	1952 Crop	1952 Planting
B.3337	38.33	18.66
B.34104	22.73	12.01
B.37161	21.07	25.06
B.37172	12.12	39.45
B.4098	2.07	0.47
B.H.10(12)	1.01	0.12
B.41227	0.82	0.35
B.4362	0.11	2.92

British Guiana

B.34104, the major variety in British Guiana continues to decline rapidly owing to its susceptibility to the 'Leaf Scald' disease. It is being replaced to a large extent by B.41227, B.37161 and B.4098 which are described as being tolerant or resistant to this disease.

B.41227 has performed exceptionally well in trials and on the plantations and is considerably more resistant to leaf scald than B.34104. B.37161 is also considerably more resistant to this disease than B.34104. It appears to be at its best on the higher river bank soils, but has also done well on the clay and pegasse soils. However, it is reported to show signs of rotting if reaping is delayed after the crop has grown for more than thirteen months.

B.4098 is reported to be immune to leaf scald and is seen in the variety table for the first time in the 1953 crop occupying 4% of the total acreage.

The variety percent. acreage figures for the 1952 and 1953 crops are given below:—

VARIETY			CROP YEAR	
			1952	1953
B.34104	...	...	60.2	47.7
B.41227	...	...	12.7	21.7
B.37161	...	...	9.4	14.4
B.4098	...	...	—	4.6

Antigua

B.4098 continues to be the major variety planted in Antigua, and appears to have been planted on a considerably increased scale. The figures for the 1953 crop are not available, but those for the crop to be cut in 1954 are, and these show that B.4098 has jumped from 64.58% for the 1952 crop to 85.85% for the 1954 crop. This expansion has been at the expense of B.37161 mainly, but there has also been a falling off in the acreage of B.3439, B.37172 and B.34104. B.4098 appears to be at its best in Antigua and, although it suffered some damage as a result of the hurricane of 1950, planters are obviously prepared to risk such losses, so excellent is its performance.

Variety percent. acreage figures for the major varieties grown are given below:—

VARIETY			1952 Crop	1954 Crop
B.4098	...	...	64.58	85.85
B.37161	...	...	24.81	8.66
B.3439	...	...	4.00	2.58
B.37172	...	...	3.54	2.47
B.34104	...	...	2.75	0.44

St. Kitts

Once again, the variety position in St. Kitts has closely followed that in Barbados. B.37161 dominates the cane acreage, but has shown a considerable decrease in area for the 1953 crop, and now occupies 75.96% of the area under cane. B.41211 has increased considerably and now covers 13.52% of the area. Small increases in the area under B.34104, B.3337 and B.41227 are also recorded. The case of B.34104 is rather interesting. In 1947, it occupied 8.34% of the area under cane. By 1950, it had fallen to 1.38%, when it started to rise again and by 1953, was occupying 4.37% of the cane area. This variety appears to be particularly suitable for planting in the higher elevations with good rainfall. B.4098 tends to uproot in the light soils of St. Kitts, and for this reason has never been grown on any considerable scale.

The major variety percent. acreage figures for the 1952 and 1953 crops are given below:—

VARIETY	CROP YEAR	
	1952	1953
B.37161	83.94	76.96
B.41211	8.38	13.52
B.34104	2.98	4.37
B.3337	1.46	2.01
B.41227	0.26	0.60
B.4098	0.08	0.05

St. Lucia

The variety picture for 1953 has changed little since last year. B.37161 continues to be the main variety planted, but B.37172 is a good second. This variety is reported to stand wet weather well without rotting. B.4362 has done reasonably well, but is reported to be choosy of soils, and arrows heavily. However, it fills the role of an early ripening variety which gives a reasonable juice at the beginning of the crop. B.41227 is not finding favour with the planters, and the area under this variety is falling. B.4098 is reported to be a poor ratooner in St. Lucia, and the area under this variety is consequently being reduced.

Due to the long ratooning practised in St. Lucia, varietal changes are likely to be more gradual than in some of the other Islands.

The major variety acreage figures for the 1952 crop and that to be reaped in 1954 are given below:—

VARIETY	1952 Crop	1954 Crop
B.37161	34.5	38.7
B.37172	15.4	23.3
B.H.10(12)	15.7	11.1
B.4362	11.0	16.5
B.4098	8.9	5.1
B.34104	8.5	1.8
Others	6.4	3.5

IV. RATOON STUNTING DISEASE

A visit was paid to Barbados by Dr. Steindl of Australia to investigate ratoon stunting disease. Dr. Steindl found symptoms suggestive of ratoon stunting on most of the varieties being grown on a commercial scale, but not on the main variety, B.37161. Similar symptoms have subsequently been observed on this variety.

Dr. Steindl recommended that nurseries of clean planting material should be established, and suggested that the best method of treatment would be hot air in a water-jacketed oven at a temperature of 54° C. for eight hours. Two electrically-operated ovens which would carry a fairly large number of cuttings at the required temperature have accordingly been ordered.

V. EXPERIMENT WITH *S. SPONTANEUM* BURMA

An attempt was made to induce flowering in *S. spontaneum* Burma by enclosing it in a dark chamber and exposing it to full sunlight for two hours daily from mid-day to 2 p.m. for a period of two months. An attempt was made to ensure absolute darkness and this resulted in very high temperatures inside the chamber during the day. Whether it was this factor or some other unknown factor which was the cause of the trouble, it is impossible to say, but by the time the two-month period was up some of the plants had died, and the others were nearly dead. However, those still alive recovered and grew well, but failed to produce any flowers.

During the current season, the chamber has been modified to allow of a certain amount of ventilation, and this has resulted in a small amount of light being admitted. However, it is understood that in India, where this treatment was originally tried, the dark chamber was made of coconut matting, and was by no means light proof. The rooted cuttings of Burma were put in on the 10th August, and will be removed to full sunlight on the 9th October, after a period of 60 days.

VI. REPORT OF CYTOGENETICIST—1952-53

A. Field Work

1. Policy

Field work in the cytogenetics programme is concerned with research into the use of inbreeding and pure line development as a means of synthesizing improved sugar cane varieties. The method has been remarkably successful in the case of maize and certain other plant species, and has been recently shown to give promising results also in animal breeding—particularly in increasing egg-production in fowls.

Commercial sugar cane varieties at present in use are heterozygous, and in them there are deleterious characters which are linked with favourable ones, or are recessive, and therefore manifested only in their offspring when they are used as parents. The elimination of such deleterious characters would result firstly in better varieties from the commercial point of view, and secondly in varieties whose breeding potentialities would be more promising, and certainly more predictable, than those at

present available. Recessive characters can be revealed by selfing, which results in a re-arrangement of the genes in a variety without the addition of new ones. Consequently a selfing programme, if made in association with rigorous selection and a ruthless elimination of all but the best individuals, will result in the purification of the germ-plasm of varieties used as foundation stock. The length of time required before pure-breeding inbred lines are available will vary according to the make-up of the foundation stock, and will be longer in the case of polyploid and aneuploid sugar cane varieties than for simple diploids such as maize.

Selfing, particularly in the later stages of pure-line production, is accompanied by a loss in vigour, and is to be expected on theoretical grounds. However, it has been shown that with interspecific hybrids of sugar cane, reduction in vigour need not be evident in the first selfed generation, and in fact first generation selfs have been used with success as commercial varieties (*e.g.* B.3337 and B.37172). In such cases, the expected diminution in vigour takes place in later selfed generations, as has been shown already in selfed lines from B.3337.

Pure-breeding selfed lines developed by suitable selection methods, therefore, although possibly low in vigour, will have shed a number of deleterious recessive characters during their development, and crosses between appropriate individuals in different lines may result in varieties whose vigour is greater than either foundation parent. In order to find the best combination of selfed lines, it is necessary to develop a large number of these, and with this in mind, several lines have been started from each of a range of the best Barbados commercial varieties.

II. Pure Line Breeding

Progress was made during the year in the evolution of pure lines from Barbados varieties. In the breeding plots, arrowing conditions were reasonably good, and selfings were made with selected individuals from the most promising lines. A large population of seedlings was obtained from B.49D2, in the B.41211 line, all members of which had failed to flower in the previous season. Excellent results were also obtained with B.50U1, in the B.37161 line, and sufficient seedlings are available to allow of the early stages of development of several inbred derivatives from this important variety. Selfs were obtained from B.4362, which will be used as a basis for the development of mosaic-immune and high-sucrose lines.

Selections were made from the nursery of seedlings available from the 1951 breeding season, and fifty varieties were added to the breeding material at Groves, making a total of one hundred and seven which are available for breeding work during the coming season. Although some lines have failed to arrow so far, sufficient individuals from each foundation parent are present in the breeding plots to allow of the rigorous selection which is essential at this important stage of pure line development. The work has increased in volume, and sufficient crosses must be made to allow for some degree of self-sterility, which is to be expected in inbred material, and which has been encountered to some extent already.

With the reduction in vigour that is bound to occur in inbred lines which have been developed beyond the early stages, the feature of non-arrowing is likely to become more frequent, and possibly critical. Work is in progress in various countries on the control of arrowing and the means by which arrowing might be

induced in varieties experimentally, and the results of this will be closely followed, for they would have immediate application in pure line development. The barrier of male-sterility has so far been less serious than was feared at first, and it appears that male-fertility might be fixed at an early stage of the inbreeding programme by selection of suitable individuals. Also, male-sterile clones can be used in the programme, where they have particularly desirable characters, in sib-crosses or back-crosses, and male-fertile individuals selected from their progeny.

Juice qualities of the individuals in the pure lines have been followed by means of hand-refractometer readings during the crop season in the breeding plots. In general, it has been established that juice quality is well maintained in selfing. Particular attention will, of course, be paid to this aspect of the inbreds in developing special high-sucrose lines from B.4362 and other foundation parents.

It is interesting to note that in certain of the lines, vegetative characters show signs of becoming fixed at an early stage in the inbreeding programme. Some of them show little variation in cane colour, habit and leaf characters after two generations of inbreeding. Other lines appear to be slower in reaching uniformity, and still show a moderate degree of variation.

Occasional distorted internodes, caused by unilateral breakdown of the meristematic zone, and characteristic of the variety B.4098, are seen to be sometimes present in selfed offspring from this variety. Various other abnormalities, such as a heavy-tillering grass-like type, variegated foliage and striped canes, are met with from time to time in the selfed progenies, but generally speaking the selfed populations do not differ markedly from crossed populations of comparable age.

Cytological examinations were made for several off-type seedlings in a search for haploids, but up to the present none have been found. Haploids are potentially valuable as a short-cut to homozygosity, for doubling their chromosome complements by colchicine treatment or other means would result immediately in pure-breeding types.

B. Laboratory Work

III. Policy

Laboratory work in the cytogenetics programme is concerned with a cytological analysis of the breeding material at the Station, and of the varieties developed in the pure line breeding work. This involves the determination of chromosome numbers, and a study of the effects of selfing and inbreeding on chromosome complements in different inbred derivatives from several foundation varieties. Most of the Barbados commercial varieties are unstable cytologically, and the chromosome numbers of selfed derivatives are likely to differ to some extent from those of the parents. Cytological stability is a pre-requisite of a pure-breeding line, and it is important to determine at what stage in the progress towards homozygosity such stability is achieved. Chromosomes which are lost due to lack of pairing at meiosis, may carry some desirable characters, and a knowledge of the cytology of the seedlings is important in interpreting their characters and potentialities in pure line development.

Academic investigations, such as the cytology of intergeneric hybrids, do not form part of the research programme. It is felt that with the limited time which is available for laboratory work, the investigations undertaken should have direct practical application to the breeding work which is being carried out or is contemplated.

IV. Equipment

The laboratory is fully equipped for cytological, morphological and pathological investigations, and is air-conditioned to provide optimum conditions for maintenance of valuable optical equipment and for comfort in working. These aspects are not unrelated, as optical equipment could be ruined by contact with perspiration.

Important items received during the year were an additional thermo-regulated electirc embedding oven (from England) and phase-contrast equipment for use with the Leitz "Ortholux" research microscope (from U.S. zone of Germany). The latter makes possible the examination of unstained preparations, and its use is dependent upon the differential capacities of various tissues for light transmission under differing illumination systems. It is a new development in microscopy, and might be of considerable assistance in chromosome work.

V. Technique

A satisfactory technique has been developed for chromosome preparations, by which a pre-treatment results in chromosome shrinkage and spreading, greatly facilitating counting. Dehydration of fixed material is accomplished by the normal butyl alcohol schedule, and a semi-translucent stain is used to differentiate chromosomes which may overlap to some extent. An accessory lamp is used to balance the light on the drawing-board with that in the microscope when using the camera lucida. By these means, it has been found possible to obtain reliable chromosome counts regularly.

Further experience with the squash technique has shown that for use with root-tips, a special maceration process is essential. Experiments are being made with two different schedules, and it is hoped that previous difficulties will be overcome during the coming year. The squash method, together with the use of phase-contrast equipment, represents the most rapid and convenient method of making chromosome examinations.

VI. Results

Seventy-three cytological preparations were made during the year, mostly of sugar cane root-tips for chromosome study. The following chromosome numbers for Barbados varieties have been established :—

B.603	...	...	80	B.37172	...	...	...	119
B.2935	...	...	80	B.4098	...	...	...	109
B.3337	...	...	118	B.41211	...	...	...	123
B.3439	...	...	105	B.41227	...	...	...	112
B.34104	...	...	100	B.4362	...	...	...	118
B.35276	...	...	120	B.45151	...	...	...	100
B.37161	...	...	108	B.4744	...	...	...	115
				B.47419	...	...	...	104

For other varieties, the following numbers were found:—

Raiatea (<i>Erianthus maximus</i>)	...	...	...	...	...	62
Tabongo (<i>S. spontaneum</i>)	...	...	...	...	...	80
Otaheite (= Bourbon)	...	...	...	...	...	80
28 NG.251 (<i>S. robustum</i>)	...	...	...	...	...	84
Badila (original noble cane)	...	...	...	...	...	80
32 MQ.629 (<i>S. robustum</i> hybrid)	...	...	...	...	...	82
E.K.28 (from Java)	...	...	...	...	...	83

It will be noted that the Barbados commercial varieties show chromosome numbers from 100 to 123. The noble canes, previously the standard commercial varieties, have a chromosome number of 80, and the higher numbers in the present-day varieties are due to their hybrid origin, and to the chromosome doubling which accompanied the early nobilisation phase in their genealogy.

The variety E.K.28, a parent of the famous P.O.J.2878, was regarded by the Javan breeders and others as a noble cane, of the 80-chromosome group. It is, however, descended from the hybrid Loethers, which has about 99 chromosomes, and I find three extra chromosomes which must be inherited from Loethers, over and above the noble cane complement.

Selfing is accompanied by a re-arrangement of the chromosome complement. Selves from cytologically stable parents, such as the true noble canes, will have the same chromosome numbers as the parent. Two selves from B.2935, for instance, were shown both to have the expected 80 chromosomes. In the case of cytologically unstable varieties, such as the interspecific hybrids now used as commercial varieties, selfing will give offspring with chromosome numbers which may differ from that of the parent. In fact, they often show a few chromosomes less than the parent, doubtless due to non-pairing of univalents at meiosis, and their subsequent exclusion from the gametes. Chromosome numbers which were established for selves during the year, together with those for the parent varieties, are as follows:—

PARENT VARIETY				SELFS			
B.2935	...	...	80	B.50F1	...	...	80
				B.50F3	...	...	80
B.4098	...	...	109	B.49C3	...	...	105
				B.49C1	...	...	108
B.3337	...	...	118	B.49E2	...	...	116
				B.51E24	...	...	110
B.35276	...	...	120	B.49B2	...	...	102
				B.49B1	...	...	113
B.41211	...	...	123	B.49D3	...	...	118
				B.49D1	...	...	120
				B.49D4	...	...	120
				B.49D5	...	...	120
				B.49D2	...	...	121

The greatest differences in chromosome complement between parent and selves are seen to be in the case of B.35276 and its selves. B.35276 is from the cross Uba x P.O.J.2878: Uba is notoriously difficult to use as a parent on account of a high degree of sterility, and such seedlings as are obtained from crosses in which it is a parent are likely to be cytologically very irregular due to many unpaired chromosomes. On selfing such seedlings, it is to be expected that several of such chromosomes will be lost.

A number of preparations were made from the meristematic zone of young stems in several varieties, in order to find whether such tissues could be conveniently used as a source of mitoses for chromosome study. Examination showed, however, that in addition to there being usually fewer mitoses than in root-tip material, the stem tissue was more difficult to prepare and showed no advantage in any respect.

VII. *Stem Epidermis Patterns*

Most of the stem epidermis pattern preparations made and examined during the year were from selfs in the inbreeding programme. It is desired to establish to what extent segregation takes place in this respect during pure line development. It is interesting to note that in some selfs which are almost indistinguishable on major morphological grounds, there are still considerable differences in stem epidermis pattern.

The collection of stem epidermis pattern preparations now includes those for more than one hundred and twenty varieties. For examination of the patterns, phase contrast equipment has been found useful.

Artschwager distinguishes six pattern types, and uses them in his descriptions of sugar cane varieties and forms of closely-related grasses. They were also used in the descriptions of the commercial Barbados varieties that were recently published. Van Dillewijn's book "Botany of Sugarcane", published in 1952, illustrates some of Artschwager's pattern types (but numbers them wrongly in the text below the plate). It is generally agreed that some pattern types are of more common occurrence than others. This is certainly true so far as the Barbados material is concerned, for pattern 1, typical of the noble canes and many interspecific hybrids, is by far the most common. It is, however, somewhat variable between varieties, and is capable of sub-division.

It is extremely doubtful whether varieties could be distinguished and classified on stem epidermis characters alone, but the patterns are a useful auxiliary feature in variety descriptions.

VIII. *Visits to Member Colonies*

Jamaica, Trinidad and British Guiana were visited with the delegates to the Eighth Congress of the International Society of Sugar Cane Technologists in April and May.

In Jamaica, several estates were visited, and the opportunity was taken to discuss the mosaic disease situation with Dr. Abbott and other pathologists who were attending the Congress. Since his return to the United States, Dr. Abbott has kindly supplied information on the reaction of several Barbados varieties to the mosaic strains there, and has undertaken to send preserved leaves exhibiting typical symptom-patterns of the strains. It is interesting to learn that B.4362 is immune to all the Louisiana mosaic strains. Dr. Abbott's co-operation in this respect is much appreciated. In certain areas of Jamaica it was noted that attack by *Helminthosporium* leaf spot was sufficiently serious to make resistance to this disease a major criterion for selection in providing new varieties for testing. Discussions were also held with members of the staff of the Sugar Research Department on the methods of seedling raising and testing, and a number of variety trials were inspected, as well as earlier-stage trials of varieties sent from the Barbados nursery. Of the commercial varieties, B.4362 was seen to be giving very good results in all districts, and B.42231, which is also mosaic-resistant and is not grown commercially elsewhere in the Caribbean, looked very promising. It is becoming increasingly popular, especially in areas which are known to be somewhat saline,

In Trinidad the propagation plots of newly-received varieties were examined with the Sugar Agronomist, and methods of variety testing were discussed. Several estates were also visited with the Congress delegates. In Tobago, accompanied by Dr. Warner, Professor Baker and Mr. Hanschell, possible sites for the location of a world collection of sugar cane varieties were investigated. The advantages of Tobago for such a collection are that while it is conveniently accessible, sugar cane is not grown commercially, and there would be specialists available nearby in Trinidad if required. Several small plots of cane were examined, which are grown for chewing. They were mostly of the old Bourbon variety, which was remarkably healthy. No case of mosaic or other serious disease was seen.

In British Guiana, the progress of the work on leaf scald resistance testing was discussed with the Plant Pathologist. The resistance trial at Uitvlugt Estate was visited, and the laboratory work at the Sophia Station was seen. Though the Barbados varieties differ somewhat in degrees of susceptibility to the disease, few have so far been found that are highly resistant, and only one (B.4098) has remained immune. The replacement of the susceptible variety B.34104 on estates by others which show greater resistance or tolerance, is making good progress.

IX. Eighth Congress of I.S.S.C.T., British West Indies, 1953

At the invitation of the B.W.I. Sugar Association, and with the approval of the Advisory Committee of the Station (Minute No. 335 of 1952 Meeting), the writer was one of the party which met delegates in Jamaica and accompanied them on tours of Trinidad and British Guiana after the Barbados sessions.

In Barbados, delegates were shown the parent varieties and the breeding technique, as well as the selfed varieties being used in the inbreeding programme. At the laboratory, the equipment was demonstrated and delegates were shown chromosome preparations and stem epidermis patterns.

Both in discussions following the papers presented at the Congress, and in informal talks with sugar cane breeders, pathologists and physiologists who were present, much valuable information was obtained. The most useful discussions followed the presentation of the writer's paper on the use of selfing and inbreeding with sugar cane, and Dr. Warner's on the Hawaiian philosophy of sugar cane breeding. The Hawaiian breeding and selection methods differ in many fundamental respects from those in use in Barbados, being less intensive and more empirical. Also, the Hawaiian breeders had been sceptical about the value of selfing as an aid to variety improvement, and of cytological work in association with breeding. Strong support for selfing was forthcoming from the Queensland breeders, who reported that it had been used with great success there, and that several of the new commercial varieties now in use were derived from selfs. This fact, and also that the inbreeding method had been successfully employed in Java, were reported by the writer in his paper. As a result of the discussions, the Hawaiian breeders and we in Barbados are better able to appreciate one another's points of view, and it may be significant that since the Congress, Hawaii (in collaboration with the U.S. Department of Agriculture) has begun work on cytogenetics of sugar cane. In Puerto Rico, too, a cytologist has recently been appointed to work on sugar cane.

The most important paper on sugar cane pathology was that by Mr. King and Mr. Steindl on ratoon stunting. It was largely due to this, and the discussion on the disease among delegates to the Congress, that a tour through the British Carib-

bean sugar-growing areas was arranged for Mr. Steindl by the B.W.I. Sugar Association. On this tour, Mr. Steindl was able to show that the disease is fairly widespread in the British West Indies, and to discuss the methods to be adopted for its control.

A resolution was passed at the Congress setting up a Committee, under the Chairmanship of Dr. Warner (Hawaii), which was required to make recommendations for the maintenance of a world collection of sugar cane varieties. The writer was nominated to be a member of this Committee.

X. Ninth International Congress of Genetics, Italy, 1953

The writer attended the Ninth International Congress of Genetics at Bellagio, Lake Como, Italy, from the 24th to 31st August, 1953, and took part in a Post-Congress tour to visit scientific laboratories and plant breeding institutes in Milan, Pavia, Florence, Rome and Naples. There were 820 members of the Congress, from 36 different countries. In his Presidential Address, Professor R. B. Goldschmidt (University of California) spoke on different philosophies of genetics. Subsequently, each morning there were sectional papers presented on human genetics, animal genetics, cell physiology, evolution, cytology, mutation, plant genetics, applied genetics, quantitative inheritance, blood groups, cytoplasmic inheritance and the genetics of disease resistance. A number of demonstrations were also given. In the afternoons, plenary sessions were held, when papers of general interest to geneticists in all fields were presented.

Among the eminent geneticists attending the Congress were the following: Sir Ronald Fisher (Cambridge), Professor J. B. S. Haldane (London), Professor S. C. Harland (Manchester), Professor C. D. Darlington (Oxford), Professor K. Mather (Birmingham), Dr. K. S. Dodds (Potato Genetics Station, Cambridge), Mr. L. F. LaCour (John Innes Horticultural Institute, Hertford), Dr. P. S. Hudson (Commonwealth Bureau of Plant Breeding and Genetics, Cambridge), Dr. F. Yates (Rothamsted), Dr. J. M. Armstrong (Canada), Professor A. F. Blakeslee (U.S.A.), Dr. G. Bremer (Holland, formerly cytologist at Paserocean Sugar Cane Breeding Station, Java), Professor T. Dobzhansky (U.S.A.), Professor A. Gustafsson (Sweden), Professor E. Hadorn (Switzerland), Dr. R. L. Knight (Cotton Breeding Station, Sudan), Dr. V. G. Panse (India), Dr. R. A. Silow (F.A.O., Rome), Professor M. J. Sirks (Holland) and Professor O. Winge (Denmark).

The writer attended, in addition to the plenary sessions, the presentation of papers on cytology, plant genetics and the genetics of disease resistance, and took part in a number of discussions following them. One of the most important papers was that by Professor Gustafsson, who reviewed the recent work in Sweden on mutations induced by irradiation in cereals and other crop plants. He showed that X-ray treatment could result in useful mutations, and might be equally as effective as hybridisation in producing variation in regard to yield, plant characters, drought resistance and disease resistance. In particular, and here the results are of direct reference to sugar cane breeding, the Swedish experiments had indicated that in polyploids the morphological frame is less easily broken than in diploids, as owing to gene reduplication, cytological re-arrangements are tolerated that would usually be eliminated in a diploid at the gamete or early zygote stage. The observation that higher-yielding mutants can be obtained from irradiated material is interesting as a corroboration that by a mere re-shuffling of the chromo-

some matter, yield can be raised. In the case of sugar cane, it has been noted that yield increases can sometimes be obtained in inter-specific hybrids by chromosome re-arrangements resulting from selfing. In an interview at Cambridge with Dr. Bell, Director of the Plant Breeding Institute, the writer was informed that recent work in England on irradiation of cereals had also given promising results.

In connection with disease resistance, the paper with the most direct application to the work in Barbados was that by Dr. Alcaraz (Spain) on the transmission of resistance to mosaic in tobacco hybrids.

Much useful information on technique and interpretation of results was obtained in informal discussions with delegates. For chromosome work with phase contrast equipment, Dr. Howard (Medical Research Council, London) recommended the use of 45% acetic acid with pre-treated material, as the light transmission characters of the usual mounting media are unsuitable. Experiments will be made with this method.

XI. Publications

The illustrated bulletin on the Barbados sugar cane varieties was issued during the year. Forty copies were distributed free to various institutions and individuals, and for review, and two hundred and twenty have been sold at £5.00 B.W.I. per copy in member colonies and foreign countries. Delegates to the I.S.S.C.T. Congress showed great interest in the Bulletin, and many copies were sold at that time.

An historical monograph on sugar cane varieties in Barbados has been prepared during the year, and will be issued as a Cane Breeding Station bulletin. It was felt desirable to have available, in one concise publication, information on the early history of sugar cane in Barbados, with records of variety introductions, data on the early breeding work, the events leading up to the formation of the B.W.I. Central Sugar Cane Breeding Station and a summary of the breeding work and results obtained up to the present. When printed, the bulletin will be distributed to member colonies, and to institutions and individuals on the Station's mailing list.

A paper on the use of selfing and inbreeding with sugar cane was presented at the I.S.S.C.T. Congress. This, and the discussion which followed its presentation, have been referred to above.

Letters on the subject of deterioration in sugar cane varieties were published in the Journals—*Sugar*, *The South African Sugar Journal*, and *The Australian Sugar Journal*.

XII. Ratoon Stunting Disease

Mr. D. R. L. Steindl, pathologist on the staff of the Bureau of Sugar Experiment Stations, Queensland, visited the B.W.I. cane-growing areas in August, at the invitation of the B.W.I. Sugar Association. Mr. Steindl was associated with the pioneer work on this disease in Queensland, and the writer accompanied him on his visits to a number of estates in Barbados. Symptoms suggestive of the disease were found sporadically on several different varieties, and Mr. Steindl gave advice on methods which can be adopted for its control. An experiment had been designed to ascertain whether the symptoms seen are in fact those of ratoon stunting disease, and work is already in progress to establish disease-free nurseries of the standard varieties in order to supply clean material for inclusion in seedling trials. Breeding for resistance to the disease could not be started until reliable information is available on the resistance status of commercial canes and breeding varieties.

VII. STATEMENT OF EXPENDITURE FOR 1952—53

1. *Recurrent*

1. Personal Emoluments	...	...	...	...	...	\$17,348.42
2. Provident Fund	...	...	...	...	...	859.20
3. Seedling Trials	...	...	...	...	...	23,434.07
4. Stationery and Library	...	...	...	...	...	266.27
5. Travelling	...	...	...	...	...	2,845.44
6. Entertainment	...	...	...	...	...	200.00
7. Rent of Land	...	...	...	...	...	598.50
8. Incidentals	...	...	...	...	...	934.52
						\$46,486.42

2. *Non-Recurrent*

Illustrated Bulletin	...	...	...	...	\$1,631.62	
Iron Framework	...	...	...	...	626.79	
Visit of Cytogeneticist to Italy	...	...	...	...	944.63	
					3,203.04	3,203.04
TOTAL	...	...	...	...	...	\$49,689.46

APPENDIX I

SUGAR CANE BREEDING, SEEDLING RAISING AND FIELD NURSERY
PLANTING 1952-53, B.54' AND B.55' SERIESDetails of Crosses made, their Germinations, Numbers Potted and Numbers Planted
in the Field Nursery and in the B.54' Series Short Season First Year Seedling Trial

CROSS	GROUP	No. Germ- inated	No. Potted	No. Planted in Nursery	No. Planted in Short Season First Year Trial
<i>S. officinarum</i> x <i>S. spontaneum</i>					
Ba.11569 x B.40123 ...	3rd Nobilisation Local ...	10	10	8	—
B.3439 x B.3337 ...	" " Glagah ...	700	501	300	100
B.4145 x P.O.J.2878	4th " Glagah ...	315	315	199	—
B.3439 x B.40123 ...	Noble x Local x Glagah ...	123	123	100	—
B.37172 x B.41211 ...	" x " x " ...	72	72	64	—
B.4145 x B.37256 ...	" x " x " ...	27	27	14	—
B.4145 x B.41211 ...	" x " x " ...	1,438	1,438	800	100
Co.421 x B.41211 ...	" x " x " ...	5,442	1,814	1,050	200
Ba.11569 x B.49138 ...	Noble x Glagah x Celebes x Local	—	—	—	—
B.3439 x B.43346 ...	Noble x Glagah x Celebes ...	530	300	209	—
B.4145 x B.43391 ...	" x " x " ...	—	—	—	—
B.43349 x P.O.J.2878	" x " x " ...	124	124	100	—
B.47179 x P.O.J.2878	" x " x " ...	155	155	120	—
		8,936	4,879	2,964	400
<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i>					
Ba.11569 x B.45301 ...	Noble x Local x Chunnee ...	20	20	17	—
B.3365 x B.34104 ...	" x " x " ...	335	335	250	—
B.37161 x B.34104 ...	" x " x " ...	87	87	44	—
B.3353 x B.37193 ...	Noble x Glagah x Chunnee ...	423	423	150	—
B.3353 x B.40175 ...	" x " x " ...	433	433	150	—
B.3353 x B.41227 ...	" x " x " ...	317	317	200	—
B.3439 x B.41227 ...	" x " x " ...	717	538	299	100
B.3439 x B.4306 ...	" x " x " ...	333	333	150	—
B.3439 x B.46136 ...	" x " x " ...	698	698	350	—
B.35207 x P.O.J.2878	" x " x " ...	909	909	500	100
B.37161 x B.41227 ...	" x " x " ...	202	202	170	—
B.37161 x P.O.J.2878	" x " x " ...	129	129	89	—
B.37172 x B.37193 ...	" x " x " ...	1,624	696	489	—
B.37172 x B.41227 ...	" x " x " ...	—	—	—	—
B.39207 x B.41227 ...	" x " x " ...	42	42	30	—
B.39207 x P.O.J.2878	" x " x " ...	324	324	277	—
B.4145 x B.37175 ...	" x " x " ...	60	60	25	—
B.4145 x B.37193 ...	" x " x " ...	832	832	300	—
B.4145 x B.41227 ...	" x " x " ...	943	943	653	100
B.42304 x B.37193 ...	" x " x " ...	691	691	500	—
B.4362 x B.37193 ...	" x " x " ...	1,022	1,022	497	100
B.4362 B.40175 ...	" x " x " ...	442	442	200	—
B.4362 x P.O.J.2878	" x " x " ...	1,674	837	589	100
B.4558 x P.O.J.2878	" x " x " ...	709	250	249	—
B.46199 x B.37193 ...	" x " x " ...	12	11	10	—
B.50151 x B.41227 ...	" x " x " ...	152	152	140	—
B.3353 x B.42231 ...	Noble x Local x Glagah x Chunnee	210	210	178	—
B.3439 x B.45237 ...	" x " x " ...	199	199	159	—
B.3439 x B.4744 ...	" x " x " ...	24	24	15	—
B.3439 x B.47419 ...	" x " x " ...	763	763	499	—

APPENDIX I—(Continued)

CROSS		GROUP	No. Germ- inated	No. Potted	No. Planted in Nursery	No. Planted in Short Season First Year Trial
B.3439	x B.47310	Noble x Local x Glagah x Chunnee	131	131	90	—
B.3439	x Co.290	" x " x " x "	275	275	248	—
B.34102	x B.34104	" x " x " x "	256	256	90	—
B.35207	x B.42231	" x " x " x "	75	75	70	—
B.37161	x B.4098	" x " x " x "	981	981	700	100
B.37161	x B.41211	" x " x " x "	705	705	400	100
B.37161	x B.47419	" x " x " x "	2,151	537	310	100
B.37172	x B.47419	" x " x " x "	642	281	200	—
B.39207	x B.4098	" x " x " x "	7	7	6	—
B.39207	x B.41211	" x " x " x "	262	262	240	—
B.39207	x B.4743	" x " x " x "	180	180	150	—
B.4094	x B.41211	" x " x " x "	15	15	13	—
B.4094	x B.41227	" x " x " x "	13	13	10	—
B.4145	x B.34104	" x " x " x "	516	516	303	—
B.4145	x B.39178	" x " x " x "	234	234	150	—
B.4145	x B.4098	" x " x " x "	179	179	149	—
B.4145	x B.4744	" x " x " x "	54	54	47	—
B.4145	x B.47419	" x " x " x "	905	905	629	140
B.42304	x B.34104	" x " x " x "	231	231	150	—
B.4362	x B.34104	" x " x " x "	205	205	148	—
B.4362	x B.39178	" x " x " x "	182	182	130	—
B.4362	x B.4098	" x " x " x "	1,220	1,000	730	160
B.4362	x B.40102	" x " x " x "	102	102	67	—
B.4362	x B.42231	" x " x " x "	888	888	560	100
B.4362	x B.46397	" x " x " x "	19	19	14	—
B.4362	x B.4744	" x " x " x "	189	189	149	—
B.4362	x B.47320	" x " x " x "	669	669	400	—
B.4362	x B.47419	" x " x " x "	1,373	1,339	1,012	100
B.4362	x B.4847	" x " x " x "	390	390	300	—
B.4362	x Co.419	" x " x " x "	42	42	20	—
B.4373	x B.39220	" x " x " x "	153	153	99	—
B.4373	x P.O.J.2878	" x " x " x "	562	562	300	—
B.44261	x B.603	" x " x " x "	28	28	20	—
B.45170	x P.O.J.2878	" x " x " x "	286	286	240	—
B.4726	x B.42231	" x " x " x "	70	70	64	—
B.4733	x B.42231	" x " x " x "	114	114	50	—
B.48330	x B.34104	" x " x " x "	930	300	250	—
B.48330	x B.41211	" x " x " x "	2,700	270	199	—
B.48330	x B.42231	" x " x " x "	1,232	586	450	—
B.48330	x Co.290	" x " x " x "	2,322	290	240	—
B.48330	x P.O.J.2878	" x " x " x "	254	254	170	—
Co.421	x B.37193	" x " x " x "	1,975	1,280	810	—
Co.421	x B.4098	" x " x " x "	1,258	1,000	770	200
Co.421	x B.46223	" x " x " x "	2,925	585	410	—
Co.421	x B.46397	" x " x " x "	5,976	966	556	—
P.O.J.2878	x B.34104	" x " x " x "	447	194	137	—
Ba.11569	x B.47151	Noble x Glagah x Celebes x Chunnee	9	9	5	—
B.37161	x B.43391	" x " x " x "	42	42	29	—
B.3439	x B.48177	Noble x Local x Glagah x Celebes x Chunnee	123	123	100	—
B.43283	x B.41227	Noble x Local x Glagah x Celebes x Chunnee	780	250	150	—
B.43295	x B.42231	Noble x Local x Glagah x Celebes x Chunnee	—	—	—	—
B.50151	x B.4098	Noble x Local x Glagah x Celebes x Chunnee	93	93	80	—
Co.421	x B.43375	Noble x Local x Glagah x Celebes x Chunnee	1,556	1,006	700	100
			51,072	31,245	20,493	1,600

APPENDIX I—(Concluded)

CROSS	GROUP	No. Germ- inated	No. Potted	No. Planted in Nursery	No. Planted in Short Season First Year Trial
B.3365 x B.603 ...	<i>S. officinarum</i> x <i>S. barberi</i> 3rd Nobilisation Chunnee ...	723	723	309	—
B.39254 x B.34104 ...	<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. Sinense</i>	35	35	29	—
B.37161 x B.47184 ...	Noble x Celebes x Chunnee x Sinense ...	—	—	—	—
B.50235 x B.412227...	Noble x Glagah x Chunnee x Sinense ...	928	464	350	—
B.39254 x B.4738 ...	Noble x Local x Glagah x Chunnee x Sinense ...	27	27	24	—
B.39254 x B.4744 ...	Noble x Local x Glagah x Chunnee x Sinense ...	10	10	8	—
B.39254 x B.47419 ...	Noble x Local x Glagah x Chunnee x Sinense ...	100	100	50	—
B.45152 x B.37175 ...	Noble x Local x Glagah x Chunnee x Sinense ...	48	48	40	—
B.45152 x B.4098 ...	Noble x Local x Glagah x Chunnee x Sinense ...	87	87	78	—
B.45220 x B.34104 ...	Noble x Local x Glagah x Chunnee x Sinense ...	—	—	—	—
B.50235 x B.4098 ...	Noble x Local x Glagah x Chunnee x Sinense ...	548	350	290	—
		1,783	1,121	869	—
B.3439 x B.47157 ...	<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. robustum</i>	3,600	380	300	—
B.3439 x B.47198 ...	Noble x Glagah x Celebes x Robustum ...	270	250	240	—
B.3439 x B.47199 ...	Noble x Glagah x Celebes x x Robustum ...	968	484	148	—
		4,838	1,114	688	—
	GRAND TOTALS ...	66,629	39,082	25,323	2,000

APPENDIX II

SUGAR CANE FIRST YEAR SEEDLINGS—B.54' SERIES

**List of Crosses and the Number of Seedlings of Each Planted in the Field Nursery
(May 1952) and in the First Year Seedling Trial (October 1952)**

CROSS	GROUP	No. Planted in Field Nursery	No. Planted in First Year Seedling Trial
B.3353 x P.O.J.2878	<i>S. officinarum</i> x <i>S. spontaneum</i> 3rd Nobilisation Glagah	130	60
B.3439 x B.3337 ...	" " "	240	120
B.3439 x P.O.J.2714	" " "	6	5
B.38272 x B.603 ...	" " "	130	55
B.38272 B.39220 ...	" " "	199	100
B.41277 x P.O.J.2878	" " "	70	33
Ba.11569 x B.39274	3rd Nobilisation Celebes	250	90
B.35197 x E.K.28 ...	" " "	89	40
B.34102 x B.3337 ...	4th Nobilisation Glagah	250	120
B.4145 x P.O.J.2878	" " "	27	20
B.42304 x P.O.J.2878	" " "	150	80
B.37172 x B.41211	Noble x Local x Glagah	250	100
Co.421 x B.41211	" x " x "	740	240
B.43349 x B.48125	Noble x Glagah x Celebes	55	30
B.47179 x P.O.J.2878	" x " x "	120	52
B.43349 x B.41211	Noble x Local x Glagah x Celebes	300	150
		3,006	1,295
B.3365 x B.603 ...	<i>S. officinarum</i> x <i>S. barberi</i> 3rd Nobilisation Chunnee	140	70
Ba.11569 x B.45111	<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> Noble x Glagah x Chunnee	48	20
Ba.11569 x B.41227	" x " x "	59	30
B.3439 x B.37193	" x " x "	500	135
B.35207 x P.O.J.2878	" x " x "	490	160
B.37161 x B.3337 ...	" x " x "	250	60
B.37161 x P.O.J.2878	" x " x "	42	12
B.37172 x B.41227	" x " x "	299	90
B.39207 x B.41227	" x " x "	120	70
B.39207 x P.O.J.2878	" x " x "	120	80
B.40157 x B.41227	" x " x "	120	60
B.4145 x B.37175	" x " x "	38	30
B.4145 x B.37193	" x " x "	420	150
B.41277 x B.41227	" x " x "	120	55
B.42304 x B.37193	" x " x "	200	100
B.4362 x B.37175	" x " x "	290	90
B.4467 x P.O.J.2878.	" x " x "	13	6
B.44167 x P.O.J.2878	" x " x "	120	60
B.4558 x P.O.J.2878	" x " x "	120	25
B.3365 x B.34104	Noble x Local x Chunnee	399	80
B.37161 x B.34104	" x " x "	50	20

APPENDIX II—(Continued)

CROSS	GROUP	No. Planted in Field Nursery	No. Planted in First Year Seedling Trial
B.3353 x B.4098 ...	Noble x Local x Glagah x Chunnee ...	120	70
B.3439 x B.4098 ...	" x " x " x " ...	310	180
B.3439 x B.45122 ...	" x " x " x " ...	120	60
B.3439 x Co.281 ...	" x " x " x " ...	160	90
B.3439 x Co.290 ...	" x " x " x " ...	160	240
B.35207 x B.48392 ...	" x " x " x " ...	200	130
B.35207 x B.5056 ...	" x " x " x " ...	120	70
B.37161 x B.4098 ...	" x " x " x " ...	210	130
B.37172 x B.4098 ...	" x " x " x " ...	120	70
B.37172 x B.44150 ...	" x " x " x " ...	120	57
B.37172 x B.46397 ...	" x " x " x " ...	250	115
B.37172 x B.47147 ...	" x " x " x " ...	360	80
B.39177 x B.46136 ...	" x " x " x " ...	150	70
B.4096 x B.35187 ...	" x " x " x " ...	15	10
B.40157 x B.34104 ...	" x " x " x " ...	130	30
B.4145 x B.34104 ...	" x " x " x " ...	400	230
B.4145 x B.4098 ...	" x " x " x " ...	900	510
B.4145 x Co.281 ...	" x " x " x " ...	30	14
B.4362 x B.34104 ...	" x " x " x " ...	300	90
B.4362 x B.4098 ...	" x " x " x " ...	669	380
B.4362 x Co.419 ...	" x " x " x " ...	24	15
B.44167 x B.47310 ...	" x " x " x " ...	100	52
B.44167 x B.48384 ...	" x " x " x " ...	140	70
B.4558 x B.4098 ...	" x " x " x " ...	101	50
B.45137 x P.O.J.2878 ...	" x " x " x " ...	250	140
B.45170 x B.41227 ...	" x " x " x " ...	300	100
B.45170 x B.41242 ...	" x " x " x " ...	100	20
B.45170 x B.43214 ...	" x " x " x " ...	80	20
B.45170 x P.O.J.2878 ...	" x " x " x " ...	250	60
B.45258 x B.41227 ...	" x " x " x " ...	150	60
B.45258 x P.O.J.2878 ...	" x " x " x " ...	150	60
B.45285 x B.41227 ...	" x " x " x " ...	120	80
B.4699 x P.O.J.2878 ...	" x " x " x " ...	120	50
B.46190 x B.4098 ...	" x " x " x " ...	120	60
B.46199 x B.4098 ...	" x " x " x " ...	32	18
B.47386 x B.4098 ...	" x " x " x " ...	120	60
B.50151 x B.41211 ...	" x " x " x " ...	120	50
B.50213 x B.41211 ...	" x " x " x " ...	149	60
Co.421 x B.46223 ...	" x " x " x " ...	410	100
P.O.J.213 x B.4098 ...	" x " x " x " ...	120	60
B.39207 x B.48231 ...	Noble x Glagah x Celebes x Chunnee ...	150	70
B.4362 x B.43391 ...	" x " x " x " ...	300	80
B.35247 x B.4847 ...	Noble x Local x Celebes x Chunnee ...	200	80
B.35197 x B.50382 ...	Noble x Local x Glagah x Celebes x Chunnee ...	39	20
B.35247 x Co.419 ...	Noble x Local x Glagah x Celebes x Chunnee ...	120	60
B.39177 x B.43391 ...	Noble x Local x Glagah x Celebes x Chunnee ...	509	90
B.43283 x B.41227 ...	Noble x Local x Glagah x Celebes x Chunnee ...	286	60
		13,222	5,604

APPENDIX II—(Concluded)

CROSS		GROUP	No. Planted in Field Nursery	No. Planted in First Year Seedling Trial
Co.421	x B.47198	<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. robustum</i> Noble x Local x Glagah x Celebes x Robustum	100	25
B.4596	x B.47198	<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. robustum</i> Noble x Local x Celebes x Chunnee x Robustum	89	40
B.4450	x B.603 ...	<i>S. officinarum</i> x <i>S. barberi</i> x <i>S. robustum</i> Noble x Chunnee x Robustum ...	80	40
B.39254	x B.34104	<i>S. officinarum</i> x <i>S. spontaneum</i> x <i>S. barberi</i> x <i>S. Sinense</i> Noble x Local x Chunnee x Sinense ...	10	5
B.42304	x B.45151	Noble x Local x Glagah x Chunnee x Sinense	300	80
B.44182	x B.45151	Noble x Local x Glagah x Chunnee x Sinense	80	25
B.44341	x B.3337 ...	Noble x Local x Glagah x Chunnee x Sinense	309	90
B.45154	x B.34104	Noble x Local x Glagah x Chunnee x Sinense	120	42
B.45154	x B.4098 ...	Noble x Local x Glagah x Chunnee x Sinense	120	60
B.4726	x B.45151	Noble x Local x Glagah x Chunnee x Sinense	160	80
B.47386	x B.45151	Noble x Local x Glagah x Chunnee x Sinense	90	40
B.47399	x B.4098 ...	Noble x Local x Glagah x Chunnee x Sinense	120	70
B.47399	x B.41211	Noble x Local x Glagah x Chunnee x Sinense	140	70
			1,449	562
GRAND TOTALS			18,086	7,636

